LEVEL II

(1)

INSTALLATION RESTORATION PROGRAM RECORDS SEARCH

For

Alaska DEW Line Stations

CH2M HILL

Supersedes
AD-A109 610

Prepared for

AIR FORCE ENGINEERING AND SERVICES CENTER
DIRECTORATE OF ENVIRONMENTAL PLANNING
TYNDALL AIR FORCE BASE, FLORIDA 32403

JUNE 1982

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS TACTICAL AIR COMMAND
LANGLEY AIR FORCE BASE, VA 23665

REPLY TO ATTN OF: DEEV

30 JUL 1982

SUBJECT: Installation Restoration Program (IRP) Records Search, AK DEWline

TO: See Distribution

1. We provided your office with copies of the subject report on or about 10 Dec 81. This study used a site rating model developed in Jun 1981 to identify the potential for contamination resulting from past disposal practices. On 26-27 Jan 82, representatives of USAF OEHL, AFESC, several major commands, Engineering Science, and CH2M Hill met at our office to develop an improved rating system. The new rating model, Hazardous Assesment Rating Methodology (HARM), is now used for all Air Force IRP studies. To maintain consistency, AFESC had their on-call contractors review their phase I studies performed before the advent of HARM and provide two additional appendices. The new appendices address the background of the HARM system and evaluate each of the phase I sites using the Jan 82 rating methodology.

2. Enclosed are copies of the added appendices for the Installation Restoration Program (IRP) Records Search at AK DEWline. Request you attach these appendices to the phase I reports we provided you in Dec 81.

3. For AFRCE-WR: Request you distribute copies of the new appendices to the Regional Environmental Protection Agency and Alaska Department of Environmental Conservation.

4. For DTIC. Request you integrate the enclosed appendices with the Installation Restoration Program Records Search for AK DEWline into the National Technical Information System (NTIS). The report and new appendices are approved for public release with unlimited distribution.

5. Our project officer for IRP is Mr. Burnet, A/V 432-4430.

FOR THE COMMANDER

George C. Windrow

GEORGE C. WINDROW
Actg Dir of Eng & Env Plng

1 Atch
Appendices

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CH2M HILL

Prepared for

AIR FORCE ENGINEERING AND SERVICES CENTER
DIRECTORATE OF ENVIRONMENTAL PLANNING
TYNDALL AIR FORCE BASE, FLORIDA 32403

~~OCTOBER 1981~~
June 1982

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LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS USED IN THE TEXT

LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS USED IN THE TEXT

ADCOM	Air Defense Command
AFESC	Air Force Engineering and Services Center
AFS	Air Force Station
CE	Civil Engineering
DCS	DEW Communication System
DEW	Distant Early Warning
DOD	Department of Defense
DPDO	Defense Property Disposal Office
DSO	DEW System Office
EOD	Explosive ordnance disposal
EPA	Environmental Protection Agency
EWS	Early Warning System
°F	Degrees Farenheit
ft	Foot (feet)
FSI	Felec Services, Inc.
gpd/ft^2	Gallons per day per square foot
gpm	Gallons per minute
Max.	Maximum
MEK	Methyl ethyl ketone
Min.	Minimum
msl	Mean sea level
No.	Number
NORAD	North America Air Defense Command
N.W.	Northwest
OEHL	Occupational and Environmental Health Laboratory
PCBs	Polychlorinated biphenyls
POL	Petroleum, oil, and lubricants
RCRA	Resource Conservation and Recovery Act
SAC	Strategic Air Command
SACLOG	Strategic Air Command Logistics
SOI	Space Object Identification
S.W.	Southwest
TAC	Tactical Air Command
USAF	United States Air Force
USGS	United States Geological Survey

EXECUTIVE SUMMARY

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A. Introduction

1. CH2M HILL was retained by the Air Force Engineering and Services Center (AFESC) on May 15, 1981 to conduct the Alaska DEW Line Records Search under Contract No. F0863780 G0010 0004.

2. The identification of hazardous waste disposal sites at military installations was directed by Defense Environmental Quality Program Policy Memorandum 80-6 dated 24 June 1980 and implemented by Air Force message dated 2 December 1980 as a positive action to determine the potential for migration of hazardous or toxic wastes from DOD installations, to prevent migration, and implement clean-up actions as necessary. The Records Search comprises Phase I of the Department of Defense Installation Restoration Program. The main purpose of the Records Search Program is to determine the potential, if any, for migration of toxic and hazardous materials off the installation as a result of past operations and disposal activities.

3. The Alaska DEW Line Records Search Program included a detailed review of pertinent installation records both government and civilian contractor, contacts with various government and private agencies for documents relevant to the program, and onsite station visits conducted by CH2M HILL during the week of July 29 through August 1, 1981. Activities conducted during the onsite visits included interviews with key station employees, ground tours of station facilities, and plane overflights to identify

past disposal and possible contaminated areas. The stations included in the Records Search Program were:

Station	Geographic Name
BAR-M	Barter Island
POW-3	Bullen Point (Flaxman Island)
POW-2	Oliktok
POW-1	Lonely
POW-M	Point Barrow
LIZ-3	Wainwright
LIZ-2	Point Lay

4. In the event that the Records Search indicates that the potential exists for migration of hazardous contaminants off the installation, Phase II field work would be conducted to confirm the presence of the specific migrating contaminants and to determine the extent of migration. The restoration or containment of the hazardous waste disposal sites would comprise Phase III of the Installation Restoration Program.

B. Conclusions

1. In general, the DEW Line sites were well maintained, with no serious problems. The greatest amount of waste generated by each site consisted mostly of scrap metal which is currently returned to Seattle via sea barge (retrograde). Accidental fuel spills have been a problem in the past, but this is apparently under control. Current disposal practices at DEW Line sites do not significantly cause nor contribute to environmental problems.

2. Evidence obtained through interviews with long-time key DEW Line employees indicate that small quantities of hazardous wastes may have been disposed of in the past. Disposal practices in the early 60's included dumping of waste onto the sea ice in winter months.

3. An ongoing environmental clean-up program undertaken by FSI under Air Force directive has for the past 3 years resulted in the removal and proper disposal of most wastes which were improperly dumped in the past.

4. Where hazardous wastes are present in existing or closed (and cleaned up) dumping sites, there is a low potential for migration of pollutants beyond the boundaries of the stations due to the following reasons:

   a. Soil permeability in the strata above the permafrost is moderately low.

   b. The land surface and top of the impermeable permafrost layer is almost flat, providing little hydraulic gradient to facilitate lateral pollutant migration.

   c. The permafrost layer occurs a few feet below land surface and effectively prevents vertical migration of pollutants.

   d. The ground is completely frozen at least 8 months out of the year, further reducing the likelihood of pollutant migration.

5. Pollution migration is most likely to occur (if at all) during the brief summer months where contaminants may move downgradient above the permafrost table and discharge into streams, ponds, or the sea.

6. Table 4 provides a listing of the 44 sites identified during this investigation and their overall rating scores (if rated). The following sites were identified as areas having the highest potential for contaminant migration warranting additional study, arranged by DEW Line site:

BAR-M

Sites No. 1, 4, and 9, past and current dump sites.

Site No. 8, contaminated drainage cut.

Site No. 3, waste petroleum disposal.

POW-3

Site No. 13, old dump site.

POW-2

Site No. 16, old dump site.

POW-1

Site No. 28, fuel storage area, observed contamination.

Sites No. 31 and 32, current and past dump sites.

LIZ-2

Sites No. 40, 43, and 44, current and past dump sites.

7. The following sites are not considered to pose a significant hazard for migration of contaminants and do not warrant additional study:

BAR-M

Sites No. 2 and 12.

POW-2

Sites No. 17 and 20.

POW-1

Sites No. 25 and 29.

POW-M

Site No. 33.

LIZ-3

Sites No. 37, 38, and 39.

8. The following sites were reviewed and deemed to have no potential for migration and were therefore eliminated from further study and not included in the site rating assessment.

BAR-M

Sites No. 5, 6, 7, 10, and 11.

POW-3

Sites No. 14 and 15.

POW-2

Sites No. 18, 19, 21, 22, 23, and 24.

POW-1

Sites No. 26, 27, and 30.

LIZ-3

Sites No. 34, 35, and 36.

LIZ-2

Sites No. 41 and 42.

C. Recommendations

Although little direct evidence of hazardous contaminant migration was found during the Records Search, it is recommended that a very limited program (Phase II) be implemented for puposes of verification. Some disposed material was observed to have migrated offsite. Phase II efforts should include surface-water sampling of shallow ponds and streams near the various sites identified or, where appropriate, soil samples should be collected and analyzed. In addition, the ongoing environmental clean-up should continue in order to remove any possible sources of contamination. Additional study at each site should be as follows:

BAR-M

- Soil sampling at Sites No. 1 and 4.
- Surface-water sampling at Sites No. 8 and 9.

POW-3

- Surface-water sampling at Site No. 13.

POW-2

- Surface-water sampling at Site No. 16.

POW-1

- Surface-water sampling at Sites No. 28, 31, and 32.

LIZ-2

- Surface-water sampling at Sites No. 40, 43, and 44.

In the event that contaminants are detected from water/soil samples collected during this effort, more extensive field efforts may be necessary to quantify the extent of migration. Details of the program outlined above, including the exact location of sampling points, should be finalized as part of the Phase II program.

I. INTRODUCTION

I. INTRODUCTION

A. Background

The Air Force Engineering and Services Center (AFESC) retained the engineering firm of CH2M HILL to assemble a team of experts and conduct a Records Search for the Alaska DEW Line sites. The stations included in the Records Search are BAR-M, POW-1, POW-2, POW-3, POW-M, LIZ-2, and LIZ-3. The POW-3 site was not in operation at the time of the site visit. This site was abandoned in 1971, but still is retained by the Air Force (see Figure 1).

The Alaska DEW Line sites are somewhat unique in that a civilian contractor does all operation and maintenance at the station. The Air Force involvement consists of a contract monitor for the sites, whose tour of duty lasts only one year. The majority of people interviewed as part of the Records Search are employed by the civilian contractor.

The primary legislation governing the management and disposal of solid waste is the Resource Conservation and Recovery Act (RCRA) of 1976. Regulations and implementing instructions for the Act are continuing to be developed by EPA. Under RCRA Section 3012 (Public Law 96-482, October 21, 1981) each state is required to inventory all past and present hazardous waste disposal sites. Section 6003 of RCRA requires Federal agencies to assist EPA and make available all requested information on past disposal practices. It is the intent of the Department of Defense (DOD) to comply fully in these as well as other requirements of RCRA. Simultaneous to the passage of RCRA, the DOD devised a

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NOTE: All figures are located in a separate section immediately following the text.

comprehensive Installation Restoration Program (IRP). The purpose of the IRP is to identify, report, and correct environmental deficiencies from past disposal practices that could result in ground-water contamination and probable migration of contaminants beyond DOD installation boundaries. In response to RCRA and in anticipation of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, the DOD issued Defense Environmental Quality Program Policy Memorandum 80-6 (DEQPPM 80-6) on 24 June 1980 which directed the implementation of the IRP program.

The Records Search comprises Phase I of the Department of Defense (DOD) Installation Restoration Program and is intended to review installation records to identify possible hazardous waste contaminated sites. Phase I, the Records Search phase, is the identification of potential problems. Phase II is the quantification of the problem and determination of corrective measures that may be required. The third phase is to contain, correct, and/or mitigate identified potential environmental hazards that may be the result of contaminant migration from the installation.

B. Authority

The identification of hazardous waste disposal sites at military installations was directed by Defense Environmental Quality Program Policy Memorandum 80-6 (DEQPPM 80-6) dated 24 June 1980, and implemented by Air Force message dated 2 December 1980, as a positive action to ensure compliance of military installations with the Resource Conservation and Recovery Act (RCRA) and implementing regulations.

To conduct the Installation Restoration Program Records Search for the Alaska DEW Line sites, the AFESC retained CH2M HILL on May 15, 1981 under Contract No. F08637 80 G0010 0004.

C. Purpose of the Records Search

The main purpose of the Records Search Program is to identify the potential for contamination resulting from past practices of disposal of hazardous and toxic wastes, and to assess the possibility of contaminant migration beyond the installation boundaries. Pertinent information gathered includes the history of operations, the geological and hydrogeological conditions which contribute to the migration of contaminants off the installation, and the ecological settings which indicate sensitive habitats or evidence of environmental stress resulting from contaminants.

D. Scope

The Records Search consisted of a pre-performance meeting, onsite visits, agency contacts, a review and analysis of the information obtained, and preparation of this report.

The pre-performance meeting was held at the office of FELEC Services, Inc. (FSI), Colorado Springs, Colorado, on June 11 and 12, 1981. Attendees at this meeting included representatives of AFESC, Tactical Air Command (TAC), Strategic Air Command (SAC), FSI, Occupational and Environmental Health Laboratory (OEHL), DEW System Office (DSO), and CH2M HILL. The purpose of the pre-performance meeting was to provide detailed project instructions for the Records Search, to develop a project schedule, to provide clarification and technical guidance by AFESC, and to define the responsibilities of the base, the command, the contractor, and AFESC participating in the Alaska DEW Line Records Search.

The onsite station visits were conducted on July 29 through August 1, 1981. Each of the DEW Line Station visits included an aerial tour, an orientation meeting with the respective station supervisor, ground tours of the station,

and interviews with key employees. The following individuals comprised the CH2M HILL Records Search team:

1. Mr. Gary E. Eichler, Project Manager/Hydrogeologist
   (M.S., Engineering Geology, 1974)

2. Mr. Brian H. Winchester, Ecologist
   (B.S., Wildlife Ecology, 1973)

3. Mr. Gus Andress, Engineer
   (M.S., Environmental Engineering, 1977)

4. Ms. Barbara Britt, Technician
   (Pre-engineering)

Resumes of the key employees are included in Appendix B.

Various government and private agencies were contacted for documents and information relevant to the Alaska DEW Line Records Search effort. Appendix C lists the agencies contacted during the Records Search.

The individuals from the Air Force and FSI who participated in the Alaska DEW Line Records Search included the following:

1. Mr. Bob Worchester (FSI)
   Environmental Coordinator

2. Capt. Ronald Descheneaux (TAC)
   Command Representative

3. Bill Skinner (FSI)
   Acting Area Manager--Alaska DEW Line

E. Methodology

The methodology utilized in the Alaska DEW Line Records Search is shown graphically on Figure 2. First, a review of past and present industrial operations is conducted at the stations. Information is obtained from available records such as shop files and real property files, as well as interviews with key employees from most operating areas of the station.

The next step in the activity review process is to determine the past management practices regarding the use, storage, treatment, and disposal of hazardous materials from the various operations at each DEW Line site. Included in this part of the activities review is the identification of all past landfill sites and burial sites; as well as any other possible sources of contamination such as major PCB or solvent spills, or fuel-saturated areas resulting from large fuel spills or leaks.

An aerial overflight and a general ground tour of identified sites are then made by the Records Search Team to gather site-specific information including (1) evidence of environmental stress, (2) the presence of nearby drainage ditches or surface-water bodies, and (3) visual inspection of these water bodies for any obvious signs of contamination or leachate migration.

A decision is then made, based on all of the above information, whether a potential exists for hazardous material contamination in any of the identified sites. If not, the site is deleted from further consideration. If minor operations and maintenance deficiencies are noted during the investigations, the condition is reported to station supervisor.

For those sites where a potential for contamination is identified, a determination of the potential for migration of the contamination off the installation boundaries is made by considering site-specific soil and permafrost conditions. If there is little potential for contaminant migration, then the site is deleted from further consideration. If the potential for contaminant migration is considered significant, then the site is evaluated and prioritized using the site rating methodology described in Section IV. B "Disposal Sites Identification and Evaluation."

The site rating indicates the relative potential for contaminant migration at each site. For those sites showing a higher potential, recommendations are made to quantify the potential contaminant migration problem under Phase II of the Installation Restoration Program. For those sites showing a medium potential, a limited Phase II program may be recommended to confirm that a serious contaminant migration problem does not exist. For those sites showing a lower potential, no further follow-up Phase II work would be recommended.

II. STATION DESCRIPTIONS

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A. Location

The Alaska DEW Line stations are located in a remote and sparsely populated area at approximately 100-mile intervals across the northern coast of Alaska. The easternmost site is located on Barter Island near the Canadian border and the westernmost site is located at Point Lay. Figure 1 shows the location of each station. The following is a list of the station names, locations, sizes, and number of personnel assigned to each site.

Station	Geographical Name	Number of Acres	Average No. of Station Personnel
LIZ-2	Point Lay	1,442	17
LIZ-3	Wainwright	1,185	17
POW-M	Point Barrow	268	19
POW-1	Lonely	2,830	17
POW-2	Oliktok	2,325	17
POW-3	Bullen Point (Flaxman Island)	620	0
BAR-M	Barter Island	4,353	75

Four of the sites are located near native villages. With the exception of Barrow, the villages have located near the site by choice, the site being there first. Barrow is the largest native Eskimo village in Alaska with a population of approximately 800 people. Barrow is located approximately 4 miles east of POW-M. The village of Kaktouik is located approximately 1 mile south of the main living area at BAR-M and has a native population of approximately 70 people. Wainwright is located approximately 5 miles northeast of LIZ-3 and has a population of approximately 30. The native village of Point Lay is located approximately 1 mile north of LIZ-2 and has a population of approximately 40. POW-1, POW-2, and POW-3 are completely isolated.

B. Organization and Mission

The Alaska DEW Line was the original experimental section which went into operation in 1953; experience there led to construction of the remaining 2,000 miles of the DEW Line across the north coast of Canada. In 1957 it was turned over to a civilian contractor for operation and maintenance.

Today, the Alaska DEW Line is a U.S. Air Force contractor-operated radar/communications network which is part of the overall TAC/NORAD air defense mission. The DEW System office is responsible for discharging all contract monitoring responsibilities of the U.S. Air Force with the contractor concerning the operation, maintenance, and support of the Distant Early Warning (DEW) System. The DEW System office must also ensure adequate support of the contractor in all areas by military agencies.

The whole DEW Line system for military, functional and operational purposes is divided into six sectors. However, the contractor has been permitted to restructure the DEW Line into four civilian geographical sections for administrative and logistic purposes. Civil Engineering management is provided on the Alaska DEW Line segment from the DEW System office, Colorado Springs, Colorado.

Each section name is derived from its geographical location, e.g., BAR from Barter Island, POW from Point Barrow, and LIZ from Cape Lisburne. Auxiliary sites are designated by a number following the symbol of the next westerly main station. The geographical locations listed for the sites come from the U.S. Geological Survey Quad Sheet on which they are located. The only discrepancy occurs on POW-3, which is listed as Flaxman Island; the site is actually located at Bullen Point rather than Flaxman Island.

The contractor is responsible for maintenance management of real property facilities, which include the buildings, roads, grounds, aircraft facilities, antenna structures, utility plants, and systems of supply, generation, or disposition of electricity, water, sewage, and refuse. These responsibilities are carried out at each site through the station supervisor and the area manager for the Alaska DEW Line sites.

The Alaska DEW Line receives support from the U.S. Air Force in this sector from two officers who function as contract monitors for the sites LIZ-2 to BAR-M. The POW-M site also receives support from the U.S. Navy on portions of their operation and maintenance, as does POW-1, where Husky Oil (a private company) takes responsibility for all refuse control.

The primary mission of the Distant Early Warning System is to detect and report all airborne vehicles operating within the designated detection capabilities of the 31 surveillance radars (6 of which are located on the Alaska DEW Line) regardless of direction and movement. Also, this mission includes the operation and maintenance of the DCS communications network, which is a part of the overall TAC/NORAD air defense mission.

III. ENVIRONMENTAL SETTING

III. ENVIRONMENTAL SETTING

A. Meteorological Data

The Alaska DEW Line stations are located in the climatic zone called the Arctic Region. This type of environment consists of cold average temperatures with strong northern winds blowing across the station locations. Although the region is continuously wet in summer and dotted with lakes, the amount of precipitation is low. Therefore, this region is classified as a frozen desert.

Average minimum and maximum temperatures along the north coast of Alaska are -25° and +44°F, respectively. Summer minimum temperatures drop below freezing. Table 1 lists temperature ranges at selected stations.

In the Arctic Region, wind chill temperature values are more important to terrestrial biological systems than the free air temperature. Strong winds coupled with cold winter temperatures can cause the wind chill factor to reach below -100°F.

Another factor in the long cold winters at the DEW Line stations is loss of solar energy due to lack of sunlight. For example, at Barrow the sun sets on November 18 and does not rise again until January 24, with an elapsed time of 66 days. During this time only a short period of twilight or indirect sunlight occurs. However, cloud cover and warm winds generated in lower latitudes (westerlies) flowing across the coast somewhat moderate the temperatures during the winter. During the summer months at Barrow, the sun rises May 10 and does not set until August 2, with an elapsed time of 84 days. Even with the increased amount of sunlight, very little of the energy reaches the surface because of the extensive cloud cover that absorbs or reflects the light.

Table 1
AVERAGE TEMPERATURES AT SELECTED DEW LINE STATIONS

Stations	Summer		Winter		Extremes (°F)
	Average Minimum (°F)	Average Maximum (°F)	Average Minimum (°F)	Average Maximum (°F)	
BAR-M, Barter Island	30	46	-20	-6	-59 to 75
POW-2, Oliktok[a]	30	47	-24	-6	-49 to 75
POW-M, Barrow	29	44	-25	-6	-56 to 78
LIZ-3, Wainwright	30	49	-26	-6	-56 to 80
LIZ-2, Point Lay	32	53	-27	-5	-55 to 78

[a]Only limited data available, may not necessarily represent average conditions.

NOTE: Period of record is from 1959 to 1974 except for Oliktok.
SOURCE: Alaska Regional Profiles, The University of Alaska, Arctic Environmental and Data Center, 1975.

Average precipitation along the Alaska DEW Line is generally low, about 5 to 7 inches per year. Most of the precipitation occurs as rain during the summer. The average amounts of precipitation at selected stations are shown below:

Station	Amount of Precipitation
BAR-M, Barter Island	7" (includes 45" of snow)
POW-2, Oliktok	5" (includes 19" of snow)
POW-M, Barrow	5" (includes 29" of snow)
LIZ-3, Wainwright	6" (includes 12" of snow)
LIZ-2, Point Lay	7" (includes 21" of snow)

Source: Alaska Regional Profiles, The University of Alaska, Arctic Environmental and Data Center, 1975.
Note: Approximately 10 inches of snow equals 1 inch of water.

B. Geology

The DEW Line radar installations are situated in the Arctic Coastal Plain physiographic region. The major physiographic features of the Arctic region are illustrated on Figure 3.

The Coastal Plain is a smooth surface showing little relief, sloping downward to the north from the foothills of the Brooks Range. Due to the flat terrain and the continuous occurrence of permafrost, marshes and lakes are abundant. Permafrost refers to naturally occurring earth materials whose temperature is below 32°F year round. The coastline is characterized by low coastal banks with narrow gravel beaches. Coastal erosion occurs as thermal undercutting of

the frozen bank and slumping into the sea. The Alaska DEW Line sites are at elevations of approximately 5 to 80 feet above msl.

The surficial soil that predominates at all the sites is a poorly drained peat with a silty loam texture. Polygonal surface patterns are abundant, and the permafrost table is near the surface. Underlying the soil are Quaternary and Recent unconsolidated sand, gravel, silt, and clay of the Gubik Formation. Their thickness varies from a few feet to 150 feet, and the beds occur as lenses and mixtures of sediment. The formation was deposited in a shallow, near-shore shelf marine environment. Frequent sea level changes alternately exposed and inundated the coastal plain depositing, reworking, and mixing the sediments. The formation may locally be modified by alluvial, eolian, lacustrine, and frost processes.

At LIZ-2 the formation is more silty than at the other DEW Line sites, and at LIZ-3 the unconsolidated sediments have been eroded away by the Kuk River to expose the underlying consolidated Cretaceous and Jurassic sandstones, shales, and conglomerates. Figure 4 shows the general geology at the surface throughout the Arctic region.

Tertiary, Cretaceous, and Jurassic sandstones, siltstones, shales, and conglomerates underlie the unconsolidated sediments throughout the coastal plain. This strata is from 2,000 to 12,000 feet thick along the coastal margin and generally thickens toward the foothills to the south. It is underlain by more predominantly deep water sediments: limestone, siltstone, shale, and sandstone. Below this strata are metamorphics of the Devonian period and older, which comprise the basement rock and are predominantly quartzite schists, marble, and slate. Figure 5 is a north-south cross section through Barrow (POW-M) showing the general configuration of the geology to bedrock.

C. Hydrology

The DEW Line sites are all located within a few thousand feet of the Arctic Ocean. Surface drainage occurs as sheetflow and shallow creek runoff from near the coast. Infiltration also may occur to a limited extent down to the permafrost table in the summer months.

Numerous rivers, originating in the Brooks Range and the foothills, cross the coastal plain and empty into the Arctic Ocean. The rivers west of the Colville River exhibit drowned coastal features indicating subsidence of the coastal plain, whereas the Colville and rivers east are building deltas into the ocean, an emergence feature.

Thousands of lakes occur on the coastal plain and are known as "thaw lakes." These are thermokarst features and are formed where water collects in a ground surface depression. The permafrost beneath the pool melts, and the lake starts expanding as the melting continues at the lake margins. When the lake intersects lower ground and drains, the area becomes a marsh and may refreeze. These lakes are generally less than 10 feet deep and remain frozen 9 months of the year.

The water supplies for each of the sites are from nearby freshwater lakes. Of all the sites, POW-M is the most susceptible to water quality deterioration from salt-water spray or flooding. Due to the low elevations of LIZ-2, POW-M, and POW-2, these installations are moderately susceptible to coastal flooding.

Runoff at the sites follows natural depressions, improved ditches, and also occurs as sheetflow. Figures 6 through 13 show the general drainage patterns at each site.

The presence of permafrost throughout the region limits the development of ground water to virtually nil. The top of the permafrost table occurs near the surface to a depth of approximately 20 feet, and the ground is permanently frozen to depths in excess of 1,300 feet near the coast. Figure 14 illustrates the extent of permafrost within the region and the recorded depth of the bottom of frost at selected sites.

Permafrost and frost action are responsible for many of the features in the coastal plain. Pingos and frost mounds are rounded hills of various size formed when thaw lakes drain, leaving marshy ground. When permafrost encroaches, the expansion of the water as it freezes pushes the center of the area upward, forming an ice core hill.

Polygonal or patterned ground occurs when the ground contracts and cracks during the winter. Snow and water accumulate in the cracks and during the following winter expand and force material vertically. In marshy areas, the ridges continue to grow in height. In well drained areas, the cracks form natural drainage channels and subside relative to the center of the polygon. Thaw lakes often form in the depressed center of a polygon in poorly drained areas.

The only ground water that is potentially developable occurs within the thaw bowl present under larger lakes, streams, and rivers. Some wells have been constructed in the thaw areas near stream channels and lakes, but long-term effectiveness of these wells is unknown.

Due to the occurrence of permafrost at all the sites, any water or contaminant placed on the ground or in the soil will not infiltrate deeper than the seasonally active layer of the frost. There it may be frozen and remain in place or (during the summer seasons) may move downgradient and discharge

into streams, ponds, or the ocean. The estimated permeability of this upper material is from 0.1 to 0.0001 cm/sec (0.2 to 0.0002 ft/min). The wide range is due to the high variability of grain size and mixture. This permeability ranges from moderately high to moderately low.

D. Environmentally Sensitive Conditions

The natural habitat at all of the DEW Line sites may be characterized as either wet or moist tundra. Both of these habitats support low growths of herbaceous and woody species such as cottongrass (Eriophorum spp.), sedges (Carex spp.), rushes (Juncus and Luzula spp.), saxifrages (Saxifraga spp.), cloudberry (Rubus chamaemorus), dwarf willows (Salix spp.), and various mosses and lichens. Although these habitats are relatively intolerant to physical disturbance, their extensive distribution around all of the DEW Line installations makes such disturbance less significant. Spills of fuel oil or other petrochemical products on tundra is detrimental, though tundra vegetation is generally able to recover with time; no long-term adverse effects were noted during site visits.

Small lakes and shallow wetlands occur in the vicinity of all of the installations, and these should be considered environmentally sensitive to chemical or other hazardous substances. Such systems are affected to a much greater degree than surrounding terrestrial tundra habitats, and adverse effects are also typically much longer-lived.

Although any potential local effect of contaminant release to the Arctic Ocean (or its tributaries) is partially mitigated by dilution processes, significant contamination may nevertheless result in accumulation of hazardous substances up the food chain. Consequently, the Arctic Ocean and all adjoining tributaries and other waters are considered environmentally sensitive habitats.

Three species listed as endangered by the U.S. Fish and Wildlife Service occur in Alaska: the peregrine falcon (Falco peregrinus), Aleutian Canada goose (Branta canadensis leucopareia), and eskimo curlew (Numenius borealis). Of these, only the peregrine falcon is likely to occur in the vicinity of DEW Line installations. It should be noted that species such as the bald eagle, gray wolf, and grizzly bear do not have endangered/threatened status in Alaska.

IV. FINDINGS

IV. FINDINGS

A. Activity Review

Major activities common to all DEW Line stations which generate significant industrial wastes are operation of the EWS and communication systems, power generation, and intermediate level maintenance (including maintenance and operation of vehicles). In the past the general procedure for all solid and liquid waste disposal was to transport it to the landfill, or in some cases to dispose of materials in shoreline ravines or out on the sea ice (so that it sank when the ice melted). The procedure now used is to package or redrum all solid or liquid chemical wastes inappropriate for incineration and to ship them out via sea lift to Seattle, annually. Some open burning still occurs (permitted by the State of Alaska on the DEW Line to burn up to 100 gallons of waste fuel/oil at a time) in station landfills. All sites have incinerators; however, the BAR-M incinerator is not large enough to handle site and village of Kaktovik waste. Therefore, some burning is still done at the dump site. Other sites which have adequate incineration facilities include LIZ-2, LIZ-3, POW-1, and POW-2.

Operation of the EWS periodically generates waste electrical or communications hardware in the form of telephone units, teletype cabinets, radio transmitters, radar components, Klystron tubes, mercury and low-level radioactive tubes, and lead storage batteries. Most of this material is now retrograded meaning to return to Seattle by way of barge annually. Solvents used in servicing and cleaning equipment include 1-1-1 trichlorethane, dichlorethane, methyl ethyl ketone, trichlorethylene, and acetone. Waste solvents are now drummed and shipped out for proper disposal. In the past they were likely disposed of in the dump site.

Tropospheric Scatter Communication facilities and other portions of the EWS contain a variety of transformers, capacitors, and rectifiers. Many of these are nitrogen filled, but some contain dielectric fluid. In some cases the dielectric fluid is known to contain PCBs, but in other cases it was not clear from records or interviews whether PCBs are present. Although there is no documentation of any PCB transformers, capacitors, or rectifiers going to landfills at the various sites, it is likely that some did in the past. It is known that transformers have been replaced at POW-1 and LIZ-2 in the past.

Heat exchange systems are periodically flushed with sulfamic acid to control scaling/corrosion. The fluid is then neutralized with sodium bicarbonate prior to discharge to the tundra. The resultant discharge should pose no serious environmental problem.

Wastes associated with power generation include waste (or spilled) fuels and oils, solvents, thinners, degreasers, possibly some capacitors or transformers, and deteriorated asbestos insulation. Interviews indicated that fuel oil spills have occurred at POW-M, POW-1, POW-2, and LIZ-3. Two spills occurred at POW-M; in 1973 a minor spill resulted from the movement of an improperly secured rubber fuel bladder, and a larger spill (date and amount unspecified) occurred in the vicinity of the hangar. POW-1 had a minor break in a fuel line in 1978, resulting in a spill of unspecified magnitude. In 1978, POW-2 also had a corosion-induced break in a fuel line, spilling roughly 300 gallons into a small tundra pond. The largest spills occurred at LIZ-3, when on two separate occasions roughly 10,000 gallons of fuel oil were spilled under the power house. A minor oil spill (5 gallons) also occurred at LIZ-2 with some resultant contamination of the adjoining lagoon. No direct evidence was observed from these spills during site visits except

where fuel/oil was currently being placed. Fuel filters are presently disposed of by incineration. Power house engines are generally given oil changes every 1,000 hours; waste oils are either burned or retrograded.

Once again, many of the capacitors and transformers in the power houses are nitrogen filled, but the presence or concentrations of PCBs in those containing dielectric fluid are not known. Breaker switches containing dielectric fluid are also present. BAR-M currently has some capacitors and transformers with small leaks. Deteriorated asbestos insulation is disposed of in landfills.

Although depot level maintenance activities have been curtailed (being concentrated at BAR-M) at many of the sites, some functions still continue, as does vehicle maintenance. Many of the solvents already listed have been utilized (including also carbon tetrachloride) but 1-1-1 trichlorethane is now probably the most commonly used (based on examinations of stock supply). Waste solvents are drummed and retrograded. Paint thinners are also used in equipment maintenance, as is some lead-based paint.

In many of the DEW Line stations, private contractors or other non-military/non-FSI personnel have stored private fuel supplies adjacent to hangar or runway facilities. These are generally not used by pilots after one year and thus in a sense have been abandoned. Oil barrels leaking onto the tundra were noted at POW-1 and POW-2. Table 2 lists possible materials which could be in dump sites at any of the stations. Records of use, time of use and quantities were unavailable.

Table 2
LIST OF POSSIBLE MATERIAL IN DISPOSAL SITES
ON ALASKA DEW LINE

Waste oils
Transmission fluids
PCB transformers/capacitors
1-1-1 Trichloroethane
Trichloroethylene
Asbestos
Old PBX telephone equipment
Sewage
Mercury vapor rectifier tubes
Lead base paints
Paint thinners
Radioactive tubes
Batteries
Scrap metal
Chlorinate hydrocarbons
Radar components
Calgon corrosion inhibitor
55 gallon drums (empty)
Lye
Lime
Corrosives
Antifreeze
Paper
Wood
Plastics
AVGAS
Valvolium (solvent)
Sulfamic acid
Dynamite
Cathode ray tube screens
RF interference filters (filters containing small amounts of PCBs)
Filtron tubes
Generators
Oscillators
Scopes
Meters
Vehicles
Trash
Copper wire
Rubber (fuel or water bladders)
Tin cans
Bottles

SOURCE: Interviewees.

B. Disposal Sites Identification and Evaluation

Interviews with past and present key employees of both the Air Force and FSI resulted in the identification of 44 sites along the Alaska DEW Line which were reviewed during this study. The sites included 14 current or former landfills, and 9 spills or other possible contaminated area sites. Also identified from interviews and site inspection were 21 sites where chemical and petroleum were stored and might have a potential for migration.

These sites, illustrated on Figures 15 through 22, were reviewed and those which had a potential for migration were evaluated using a rating system for prioritized ranking of the hazard potential of waste disposal facilities developed by JRB Associates, Inc., of McLean, Virginia, for the U.S. Environmental Protection Agency. This system was modified by CH2M HILL and Engineering Science for specific application to the Air Force Installation Restoration Program.

The JRB system consists of 31 rating factors divided into 4 categories, receptors, pathways, waste characteristics, and waste management practices, which are used to evaluate the principal targets of contamination, the mechanisms for migration, the hazards posed by the contaminants, and the facilities design and operation, respectively. Relative scores from each category are combined to give an overall score using appropriate weighting factors. A more detailed description of this hazard evaluation methodology is included in Appendix E.

The following is a brief description of each site identified during the Records Search and site visit along the Alaska DEW Line. Copies of the rating forms completed for each site which was rated are included in Appendix F. A summary of the results of the site assessment, using the modified rating system, is given on Table 3.

Table 3
SUMMARY OF RESULTS OF SITE ASSESSMENTS[a]

Site No.[b]	Site Description	Subscores (%) of Maximum Possible Score in Each Category				Average Score (Weighted Average)
		Receptors 0.22	Pathways 0.30	Waste Characteristics 0.24	Waste Management Practices 0.24	
BAR-M						
1	Old Dump Site	29	49	50	51	45
2	Sewage Lagoon	29	31	40	35	34
3	Waste Petroleum Disposal	29	54	50	41	44
4	Current Dump Site	29	54	50	51	47
8	Drainage Cut Contamination	25	57	50	7	36
9	Old Dump Site--N.W.	29	31	50	51	40
12	Old Dump Site near Air Strip	40	31	50	48	39
POW-3						
13	Old Dump Site--East	29	46	50	57	45
POW-2						
16	Old Dump Site--N.W.	26	46	50	57	45
17	Current Dump Site	26	46	40	40	39
20	Fuel Oil Spill	22	26	50	7	26
POW-1						
25	Sewage Disposal Area	29	29	30	26	28
28	POL Storage Area	29	61	50	26	43
29	Diesel Fuel Spill	29	44	50	19	36
31	Old Dump Site	29	46	50	57	46
32	Husky Dump Site	29	46	50	51	44

Site No.[b]	Site Description	Subscores (%) of Maximum Possible Score in Each Category: Receptors 0.22	Pathways 0.30	Waste Characteristics 0.24	Waste Management Practices 0.24	Average Score (Weighted Average)
POW-M						
33	Diesel Fuel Storage	16	29	50	26	30
LIZ-3						
37	Fuel Spills Power House	25	38	50	16	33
38	Current Dump Site	22	26	50	34	33
39	Old Dump Site--South	26	29	50	41	36
LIZ-2						
40	Current Dump Site	26	52	50	56	48
43	Old Dump Site--North	32	40	50	57	45
44	Suspected Dump Site	32	40	50	57	45

[a]Basis of rating system developed by JRB Associates, Inc., of McLean, Virginia, and modified by CH2M HILL and Engineering-Science for application to Air Force Installation Restoration Program Records Search.
[b]Sites 5, 6, 7, 10, 11, 14, 15, 18, 19, 21, 22, 23, 24, 26, 27, 30, 34, 35, 36, 41, and 42 were eliminated from further study and therefore not rated. Figures 15 through 22 illustrate site locations.

1. Landfills/Dump Sites

The landfills/dump sites identified at the Alaska DEW Line sites include initial construction type dump sites and current active dump sites, some of which are used by nearby native villages. Some of the older sites have been cleaned up as a result of an ongoing environmental clean-up project.

In most cases, the current dump sites are less than 1 acre in size. The exception is the dump site at BAR-M which is also used by the native village of Kaktovik. The dump sites are operated by digging into the tundra to the permafrost (2 to 3 feet) and disposing of waste in the trench. The waste is either burned and covered or covered with excavated materials or gravel brought in from some other part of the site. The exception is LIZ-2 whose dump site is located behind the site hangar at the edge of a cliff bordering Kasegaluk Lagoon.

The 14 sites that were identified and the approximate dates that these sites were in operation are summarized on Figure 23. Site descriptions are as follows:

BAR-M--Figures 15 and 16

- Site No. 1, located north of the fuel storage area at BAR-M between the sewage pond and the Beaufort Sea, is where the old dump site was used from 1956 to 1978. This site received all wastes generated at BAR-M and the village of Kaktovik located adjacent to the site. The site received domestic garbage, human and animal waste, waste POL products, scrap metal, batteries, drums, vehicles, electronic equipment, food waste, trash, and all other

waste generated by the site or the village. Disposal at this site included dumping directly into the Beaufort Sea. This site was approximately 2 acres in size and was included in an environmental clean-up project where most of the materials dumped at this site were removed (see photos in Appendix A).

- Site No. 4 is the location of the current dump site used by both BAR-M and the village of Kaktovik. This site has been in operation since June, 1978 and is approximately 2 acres in size. Disposal at the site by BAR-M personnel is controlled and is in compliance with DEW Line Instruction 825.620 dated May 11, 1979. However, the disposal of materials by the village is uncontrolled (see photos in Appendix A).

- Site No. 9 is located approximately 1.7 miles west of the current dump site (Site No. 4). The site was used briefly by BAR-M for disposal of crushed drums and steel from a burned building. This site was less than 1 acre in size and was cleaned up in 1979 when approximately 15 tons of scrap metal was removed.

- Site No. 12 is an old dump site, probably used during construction (1953-1956) and for some short period thereafter. This site received construction debris, old vehicles, drums, and all other wastes generated during this period. Dumping occurred out into the sea, especially during winter months. This site was approximately 2 acres in size and was cleaned up in 1979-80.

POW-3--Figure 17

- Site No. 13 is a dump site used from 1956 until 1971, when the station was deactivated (see photos in Appendix A). The site is less than 1 acre in size.

POW-2--Figure 18

- Site No. 16 is an old dump site which received all waste generated by the site from 1956 to approximately 1978. It was cleaned up in 1978, 1979, and 1980. The site was less than 1 acre in size.

- Site No. 17 is a current dump site, modified from an old dump site in 1980. The site is less than 1 acre in size.

POW-1--Figure 19

- Site No. 31 is an old dump site used prior to approximately 1976. After 1976, site waste disposal was handled by Husky Oil Co. (see photos in Appendix A). This site is less than 1 acre in size.

- Site No. 32 is a current dump site maintained and operated by Husky Oil Co. It is located approximately 1 mile southwest of the site, on Air Force property, and has been in use since 1976. This site is less than 1 acre in size.

POW-M--Figure 20

- Naval Arctic Research Lab (NARL) handles waste disposal for the site. Disposal is at Barrow Municipal Dump which is located approximately 2 miles from the site also used by native villagers.

LIZ-3--Figure 21

- Site No. 38 is a current dump site. It has been in use since 1974.

- Site No. 39 is an old dump site located approximately 2 miles south of site. It was closed in 1974 and cleaned up in 1979-80.

LIZ-2--Figure 22

- Site No. 40 is a current dump site and has been used since 1978.

- Site No. 43 is an old dump site and has been used from 1956 to 1978. It was cleaned up in 1979-80.

- Site No. 44 is an old dump site used by villagers and the site from 1956 to 1980. It was cleaned up in 1979-80.

Spills and Other Possible Contaminated Areas

Nine areas where spills, primarily fuel and other possible contamination, occurred were identified:

BAR-M--Figure 15 and 16

- Site No. 2 is a sewage lagoon which receives domestic wastewater from the site. The lagoon is excavated to the permafrost at a depth of approximately 4 feet and bermed. The berm and bottom are essentially impermeable; therefore, the lagoon operates by evaporation.

- Site No. 3 is a small, circular pond approximately 20 feet in diameter and 2 to 3 feet deep. This pond is saturated with diesel fuel and waste oil products and appears to be a disposal site for these products.

- Site No. 8 is an area where the site (power house) discharges washwater to a natural drainage cut flowing to the sea. There appears to be contaminated liquid, possibly antifreeze, discharged to the drainage cut which eventually goes to the sea.

POW-2--Figure 18

- Site No. 20 is the site of a 300-gallon diesel fuel oil spill which occurred in September, 1978. There was little or no recovery.

POW-1--Figure 19

- Site No. 25 is a domestic sewage disposal area.

- Site No. 28 is a petroleum storage area. Fuel/oil was observed to be collecting in an adjacent pond.

- Site No. 29 is where the fuel line ruptured and approximately 25,000 gallons of diesel spilled onto the ground in 1978 (see photos in Appendix A). There was no recovery.

POW-M--Figure 20

- Site No. 33 is an undiked diesel fuel tank and was the site of a minor fuel spill (approximately 300 gallons) in approximately 1974.

LIZ-3--Figure 21

- Site No. 37 is where two 10,000-gallon fuel spills occurred under the power house module, one in the early 1970's, the other in 1976 (see photos in Appendix A). Approximately 4,000 gallons from the second spill was recovered and used.

Other Sites Reviewed but Not Rated as Hazardous Waste Sites

Twenty-one sites, primarily storage areas, were reviewed during onsite visits and were not rated:

BAR-M--Figures 15 and 16

- Site No. 5 is the location of several large PCB-filled transformers which are in use at the Tropospheric Scatter Communication building.

- Site No. 6 is a fuel storage tank with no containment berm.

- Site No. 7 is a storage area for materials scheduled for retrograde by sea lift.

- Site No. 10 is a tank farm/fuel storage area containing diesel fuel Arctic. Adjacent to the diked enclosure around the tank farm, there is a overflow lagoon which is inadequate to contain fuel from one or more tanks.

- Site No. 11 is an unbermed diesel fuel tank.

POW-3--Figure 17

- Site No. 14 is a deactivated drum storage area used to stockpile such fluids as anti-freeze, solvents, and lube oil.

- Site No. 15 is a deactivated undiked fuel storage area.

POW-2--Figure 18

- Site No. 18 is a dock storage area.

- Site No. 19 is a petroleum products storage area.

- Site No. 21 is a drum storage area containing such fluids as antifreeze, solvents, and lube oil soap.

- Site No. 22 is a diesel fuel storage area.

POW-1--Figure 19

- Site No. 23 is a gasoline storage and material storage area.
- Site No. 24 is a diesel fuel storage area.
- Site No. 26 is a drum storage area (see photos in Appendix A).
- Site No. 27 is diesel fuel beach storage tanks.
- Site No. 30 is a vehicle and equipment storage area.

LIZ-3--Figure 21

- Site No. 34 is a diesel fuel storage area.
- Site No. 35 is a drum storage area.
- Site No. 36 is a gasoline storage area.

LIZ-2--Figure 22

- Site No. 41 is a gasoline/fuel storage area.
- Site No. 42 is a diesel fuel and drum storage area.

V. CONCLUSIONS

V. CONCLUSIONS

A. In general, the DEW Line sites were well maintained, with no serious problems. The greatest amount of waste generated by each site consisted mostly of scrap metal, which is currently retrograded back to Seattle. Accidental fuel spills have been a problem in the past but this is apparently under control. Current disposal practices at DEW Line sites would not cause nor contribute to significant environmental problems.

B. Evidence obtained through interviews with long-time key DEW Line employees indicates that small quantities of hazardous wastes may have been disposed of in the past. Disposal practices in the early 1960's included dumping of waste onto the sea ice in winter months.

C. An ongoing environmental clean-up program undertaken by FSI under Air Force directive has for the past 3 years resulted in the removal and proper disposal of most wastes which were improperly dumped in the past.

D. Where hazardous wastes are present in existing or closed (and cleaned-up) dumping sites, there is a low potential for migration of pollutants beyond the boundaries of the stations for the following reasons:

1. Soil permeability in the strata above the permafrost is moderately low.

2. The land surface and top of the impermeable permafrost layer is almost flat, providing little hydraulic gradient to facilitate lateral pollutant migration.

3. The permafrost layer occurs a few feet below land surface and effectively prevents vertical migration of pollutants.

4. The ground is completely frozen at least 8 months out of the year, further reducing the liklihood of pollutant migration.

E. Pollutant migration is most likely to occur (if at all) during the brief summer months where contaminants may move downgradient above the permafrost table and discharge into streams, ponds, or the sea.

F. Table 4 lists the 23 sites identified and rated during this investigation and their overall rating scores. The following sites were identified as areas having the highest potential for contaminant migration, warranting additional study, arranged by DEW Line site:

<u>BAR-M</u>

1. Sites No. 1, 4, and 9, past and current dump sites, due primarily to:

   - o Proximity to Beaufort Sea
   - o Suspected small quantities of hazardous waste

2. Site No. 8, contaminated drainage cut, due primarily to:

   - o Proximity and discharge to Beaufort Sea
   - o Suspected small quantities of hazardous waste

Table 4
PRIORITY LISTING OF RATED SITES

Site No.	Site Description	Overall Score
	SITES WARRANTING LIMITED ADDITIONAL STUDY	
BAR-M		
4	Current Dump Site	47
1	Old Dump Site	45
3	Waste Petroleum Disposal	44
9	Old Dump Site, N.W.	40
8	Drainage Cut Contamination	36
POW-3		
13	Old Dump Site--East	45
POW-2		
16	Old Dump Site--NW	45
POW-1		
31	Old Dump Site	46
32	Husky Oil Dump Site	44
28	POL Storage Area	43
LIZ-2		
40	Current Dump Site	48
43	Old Dump Site--North	45
44	Suspected Dump Site	45

Site No.	Site Description	Overall Score
	SITES NOT WARRANTING ADDITIONAL STUDY	
BAR-M		
2	Sewage Lagoon	34
12	Old Dump Site Near Air Strip	39
POW-2		
17	Current Dump Site	39
20	Fuel Oil Spill	26
POW-1		
29	Diesel Fuel Spill	36
25	Sewage Disposal Area	28
POW-M		
33	Diesel Fuel Storage	30
LIZ-3		
39	Old Dump Site--South	36
38	Current Dump Site	33
37	Fuel Spills--Power House	33

NOTE: Sites 5, 6, 7, 10, 11, 14, 15, 18, 19, 21, 22, 23, 24, 26, 27, 30, 34, 35, 36, 41, and 42 were eliminated from further study and not rated.

3. Site No. 3, waste petroleum disposal, due primarily to:

   - o Proximity to Beaufort Sea
   - o Observed contamination

POW-3

1. Site No. 13, old dump site, East, due primarily to:

   - o Proximity to Mikkelsen Bay
   - o Suspected small quantities of hazardous waste

POW-2

1. Site No. 16, old dump site, N.W., due primarily to:

   - o Proximity to the Beaufort Sea
   - o Suspected small quantities of hazardous waste

POW-1

1. Sites No. 31 and 32, current and past dump sites, due primarily to:

   - o Proximity to the Beaufort Sea
   - o Suspected small quantities of hazardous waste

2. Site No. 28, current POL storage area, due primarily to:

- o Observed contamination
- o Proximity to surface water

LIZ-2

1. Site No. 40, current dump site, due primarily to:
   - o Direct disposal into Kasegaluk Lagoon
   - o Suspected small quantities of hazardous waste
2. Sites No. 43 and 44, old dump sites, due primarily to:
   - o Proximity to populated area (nearby village)
   - o Proximity to Kasegaluk Lagoon
   - o Suspected small quantities of hazardous waste

G. The following sites are not considered to pose a significant hazard for migration of contaminants and do not warrant additional study:

BAR-M

Sites No. 2 and 12.

POW-2

Sites No. 17 and 20.

POW-1

Sites No. 25 and 29.

POW-M

Site No. 33.

LIZ-3

Sites No. 37, 38, and 39.

H. The following sites were reviewed and deemed to have no potential for migration and were therefore eliminated from further study and not included in the site rating assessment.

BAR-M

Sites No. 5, 6, 7, 10, and 11.

POW-3

Sites No. 14 and 15.

POW-2

Sites No. 18, 19, 21, 22, 23, and 24.

POW-1

Sites No. 26, 27, and 30.

LIZ-3

Sites No. 34, 35, and 36.

LIZ-2

Sites No. 41 and 42.

VI. RECOMMENDATIONS

VI. RECOMMENDATIONS

Little direct evidence of hazardous contaminant migration was found during the Records Search, it is recommended that a very limited program (Phase II) be implemented for purposes of verification. Some disposed material was observed to have migrated offsite. Phase II efforts should include surface-water sampling of shallow ponds and streams near the various sites identified or where appropriate soil samples should be collected and analyzed. In addition, the ongoing environmental clean-up should continue in order to remove any possible sources of contamination. Additional study at each site should be as follows:

BAR-M

- Site No. 1, old dump site--Collect soil samples at 2-foot intervals from land surface to the permafrost at a point 20 feet north of the north edge of the dump site. Analyze soil samples for heavy metals, PCBs, phenols, volatile organic compounds, and pH.

- Site No. 3, waste petroleum disposal--collect water sample and analyze for oils and greases and volatile organic compounds.

- Site No. 4, current dump site--Similar to Site No. 1 above.

Note: Heavy metals analyses should include total chromium, hexavalent chromium, cadmium, lead, mercury, selenium, and silver.

- Site No. 8, drainage cut contamination--Collect a water sample from this drainage ditch. Analyze sample for heavy metals, pH, oil and grease, PCBs, phenols, solvents, volatile organic compounds and specific conductance.

- Site No. 9, old dump site, N.W.--Collect water sample from downstream side of disposal area in drainage ditch. Analyze sample for heavy metals, PCBs, volatile organic compounds, pH, and specific conductance.

POW-3

- Site No. 13, old dump site, East--Collect surface-water sample from nearby pond. Analyze sample for heavy metals, PCBs, phenols, pH, volatile organic compounds, and specific conductance.

POW-2

- Site No. 16, old dump site, N.W.--Collect water sample from downstream side of dump site. Analyze sample for heavy metals, phenols, pH, volatile organic compounds, and specific conductance.

POW-1

- Site No. 28, POL storage area--Collect water sample from small pond area adjacent to storage area. Analyze sample for oils and grease and TCE.

- Site No. 31, old dump site--Collect water sample from nearby saltwater pond adjacent to site of old dump. Analyze sample for heavy metals, PCBs, phenols, pH, and volatile organic compounds.

- Site No. 32, Husky Oil dump site--Collect water sample from the pond area adjacent to the dump site. Analyze sample for heavy metals, PCBs, phenols, pH, volatile organic compounds, and specific conductance.

LIZ-2

- Site No. 40, current dump site--Collect water sample from Kasegaluk Lagoon adjacent to the dump site. Analyze sample for heavy metals, phenols, pH, and volatile organic compounds.

- Sites No. 43 and 44, both old dump sites adjacent to the same small pond--Collect water sample from pond. Analyze sample for heavy metals, phenols, pH, and volatile organic compounds.

In the event that contaminants are detected from water/soil samples collected during this effort, more extensive field efforts may be necessary to quantify the extent of migration. Details of the program outlined above, including the exact location of sampling points, should be finalized as part of the Phase II program.

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REFERENCES

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FIGURES

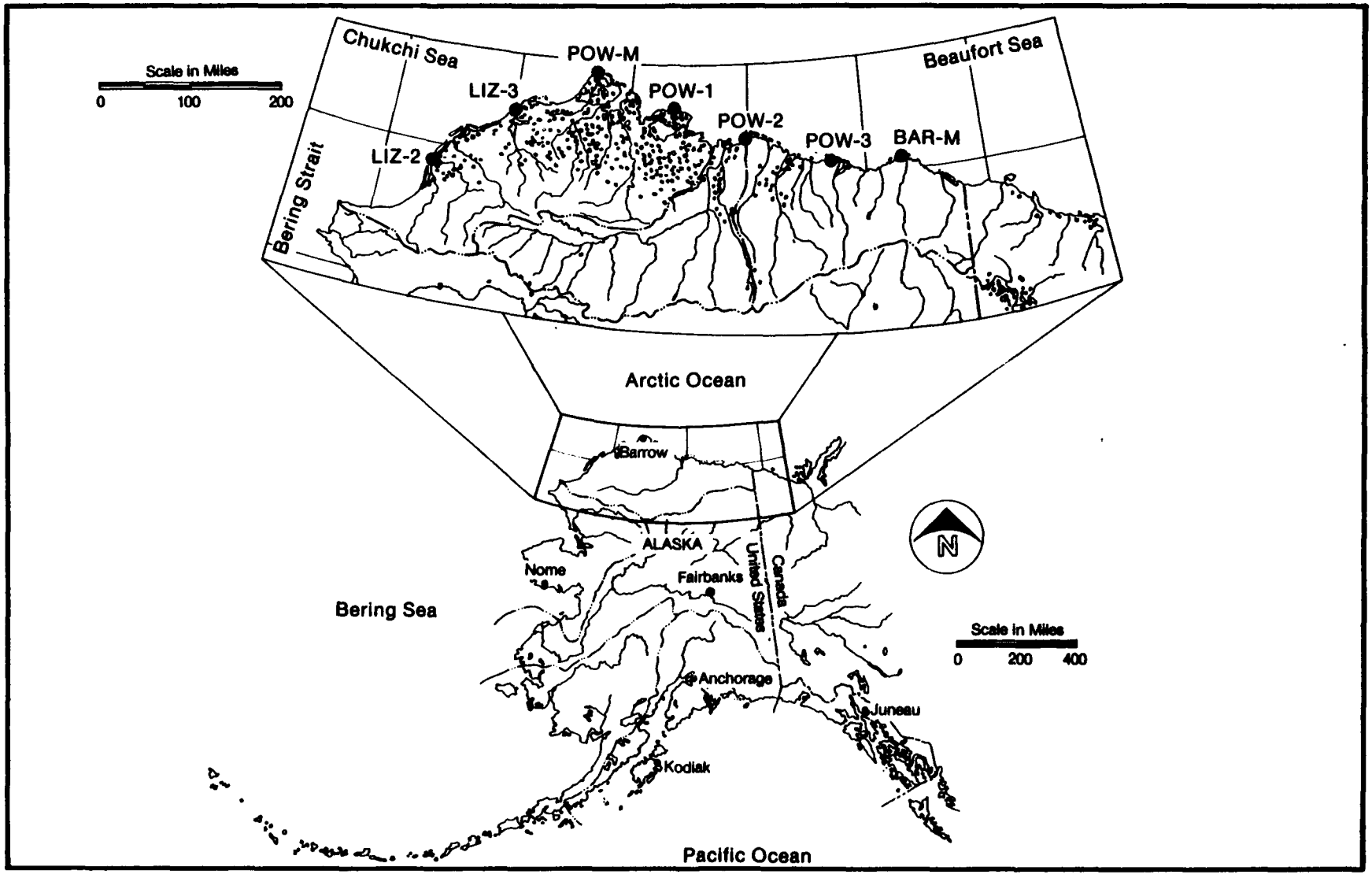

FIGURE 1. Location map—Alaska DEW Line.

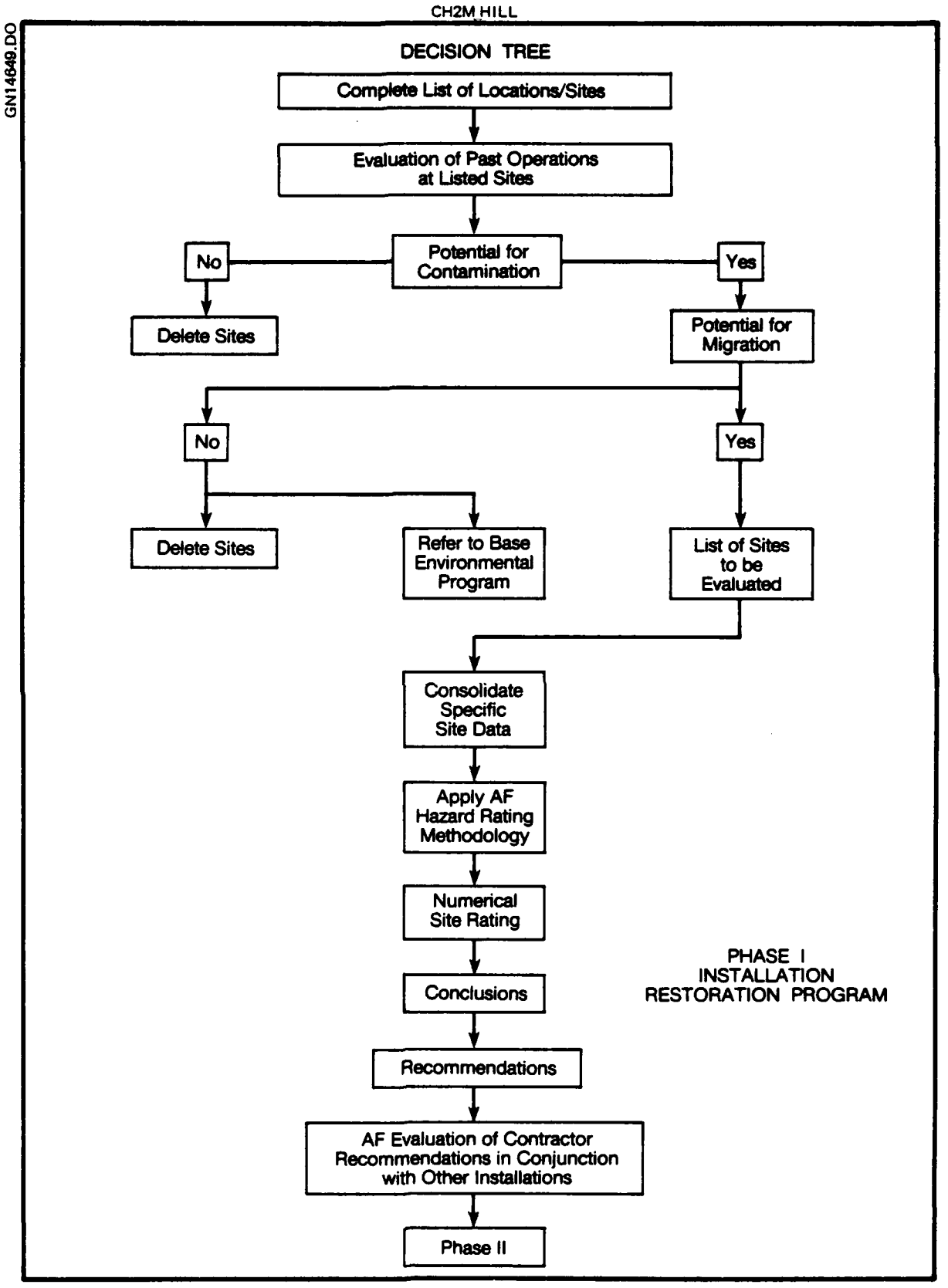

FIGURE 2. Records Search Methodology.

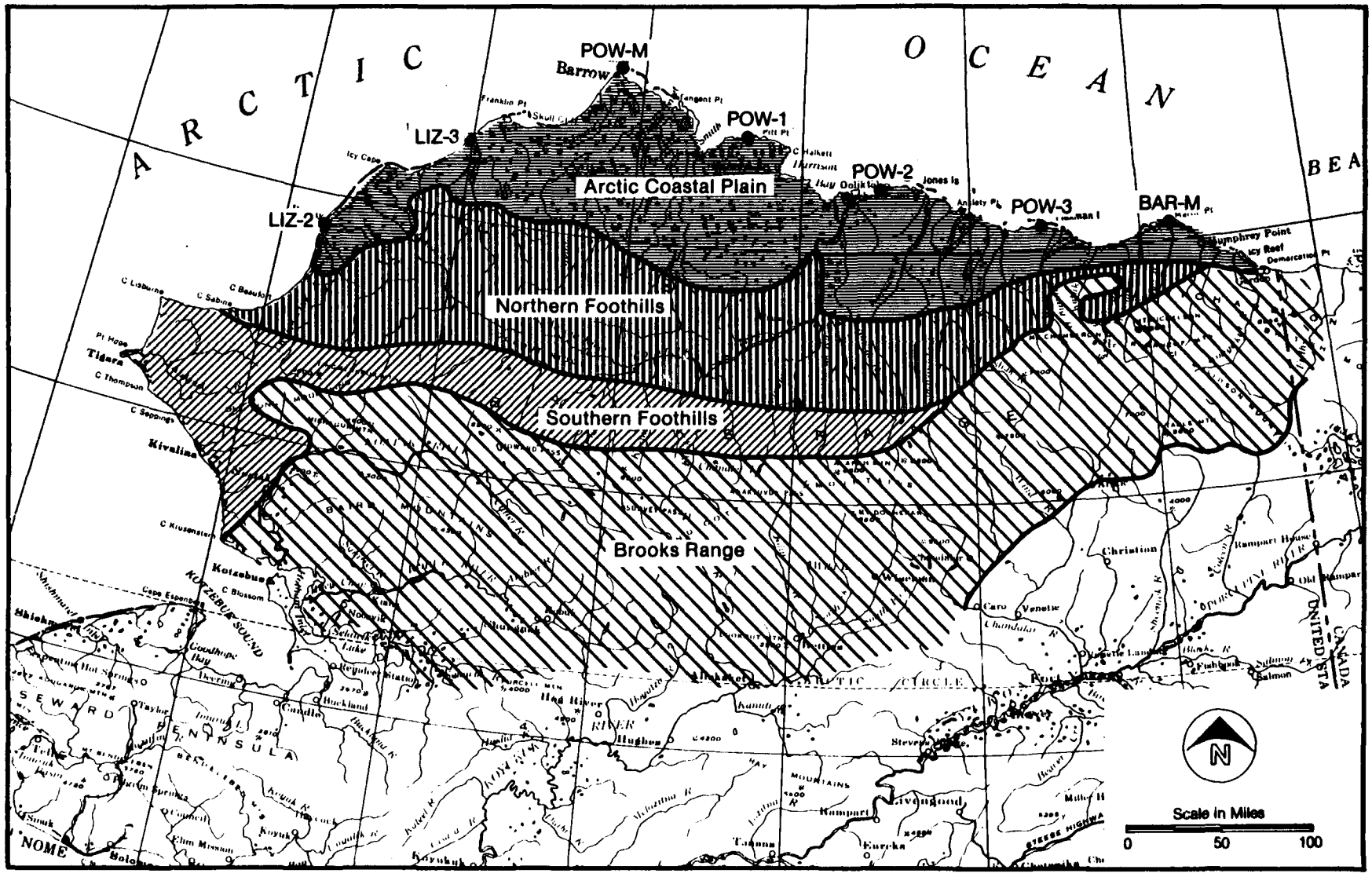

FIGURE 3. Physiographic map.

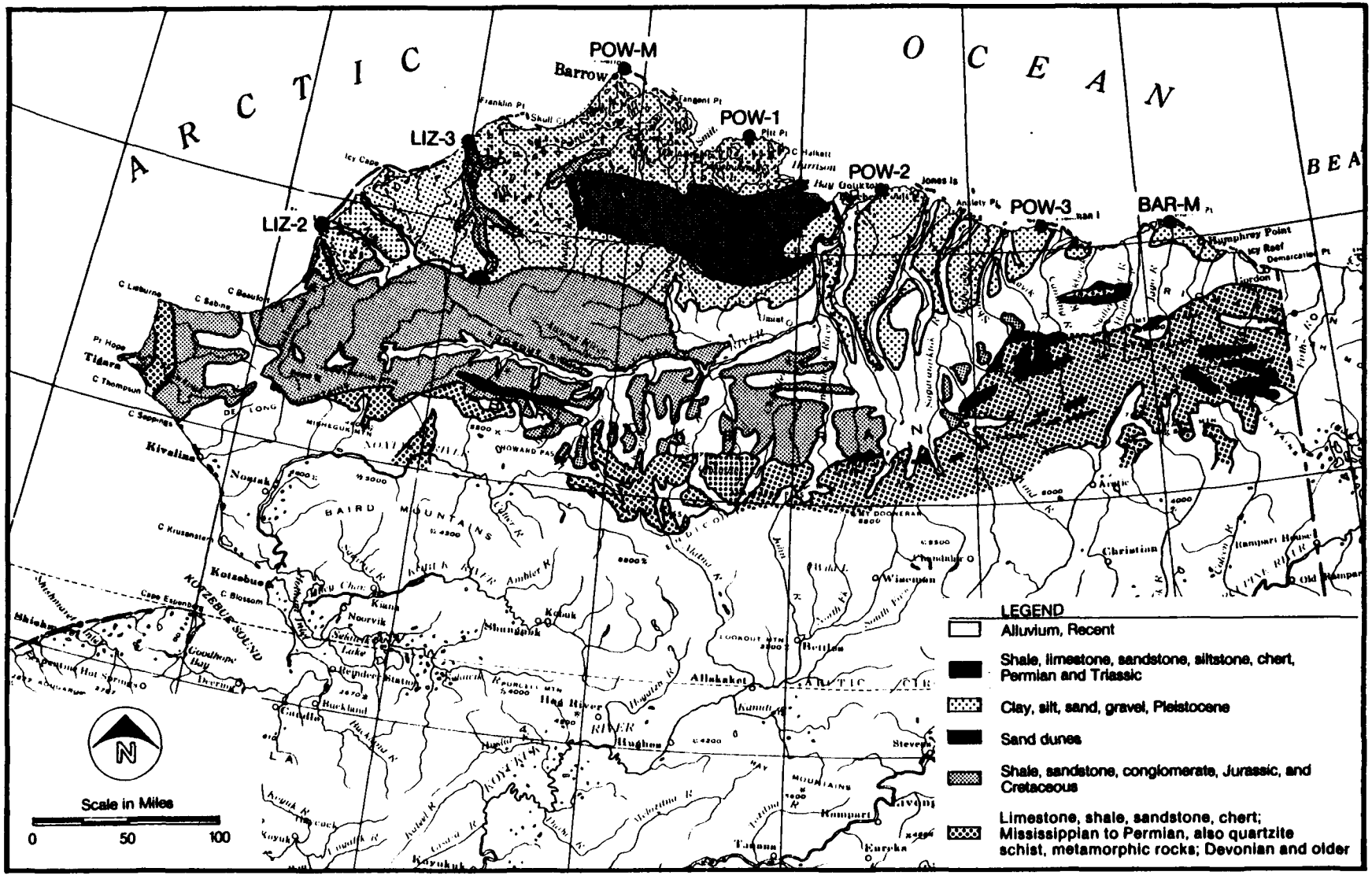

FIGURE 4. *Geologic map.*

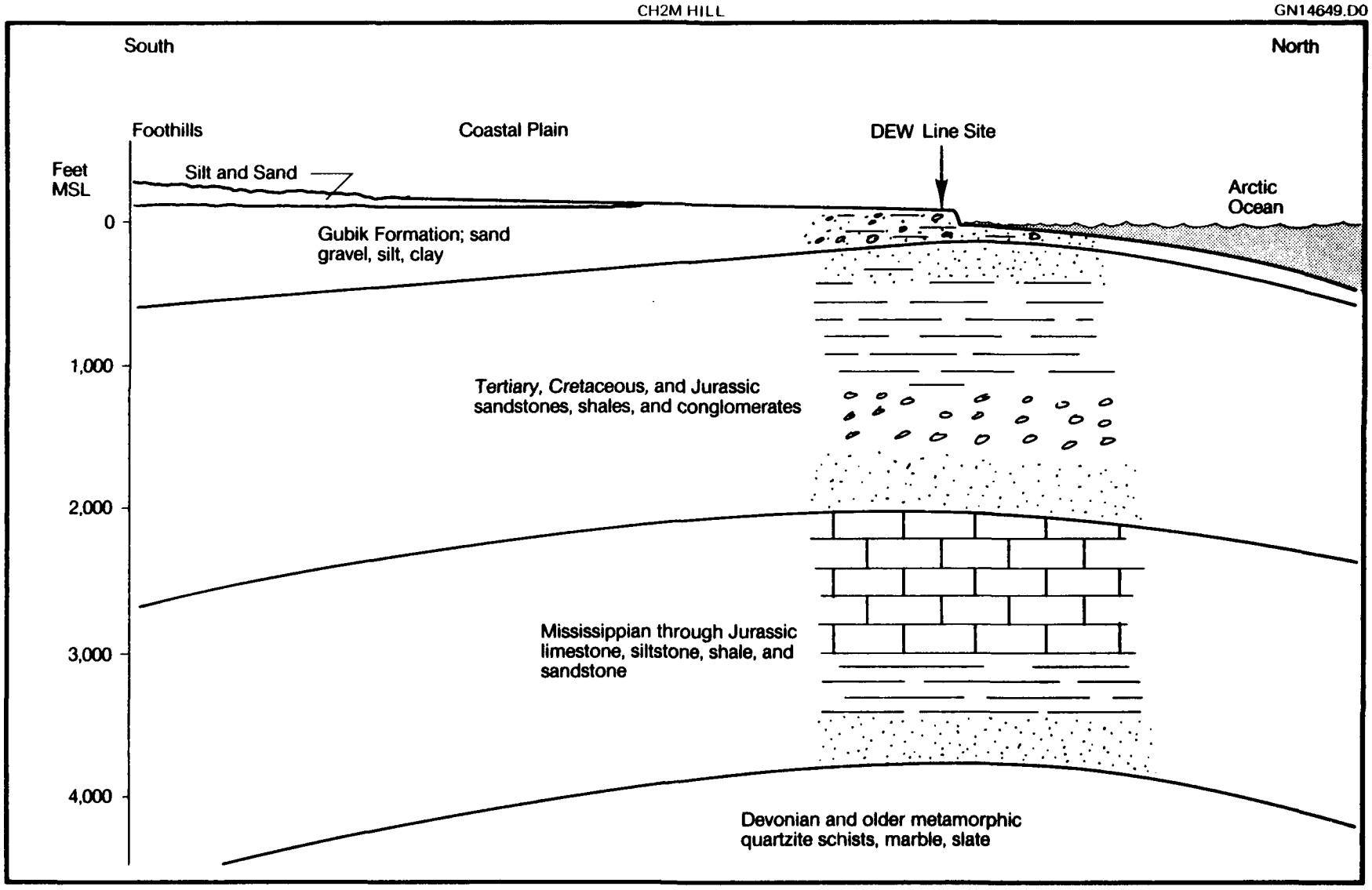

FIGURE 5. North-south geologic cross section through Barrow POW-M. (Not to scale)

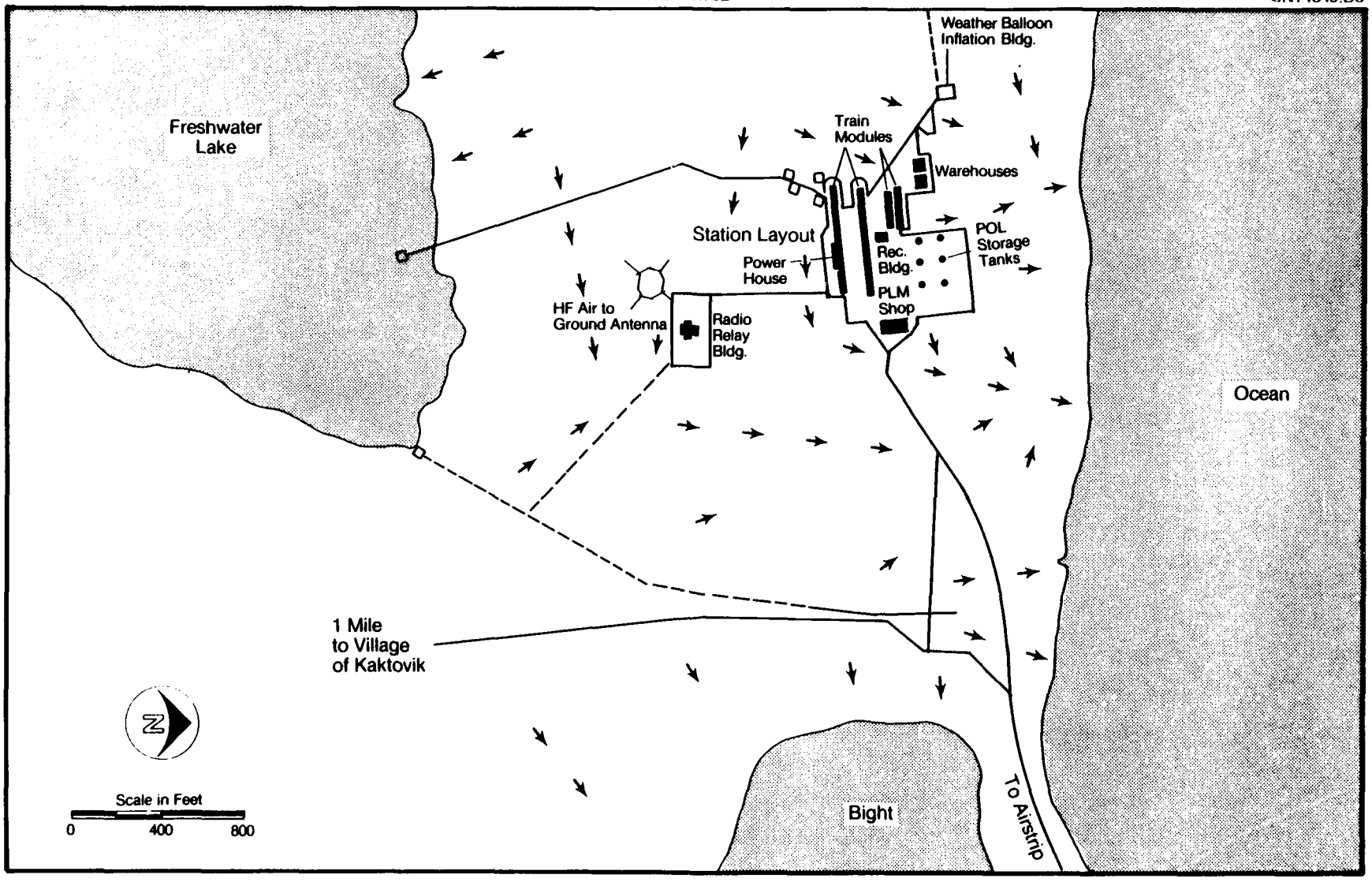

FIGURE 6. Surface drainage map of BAR-M.

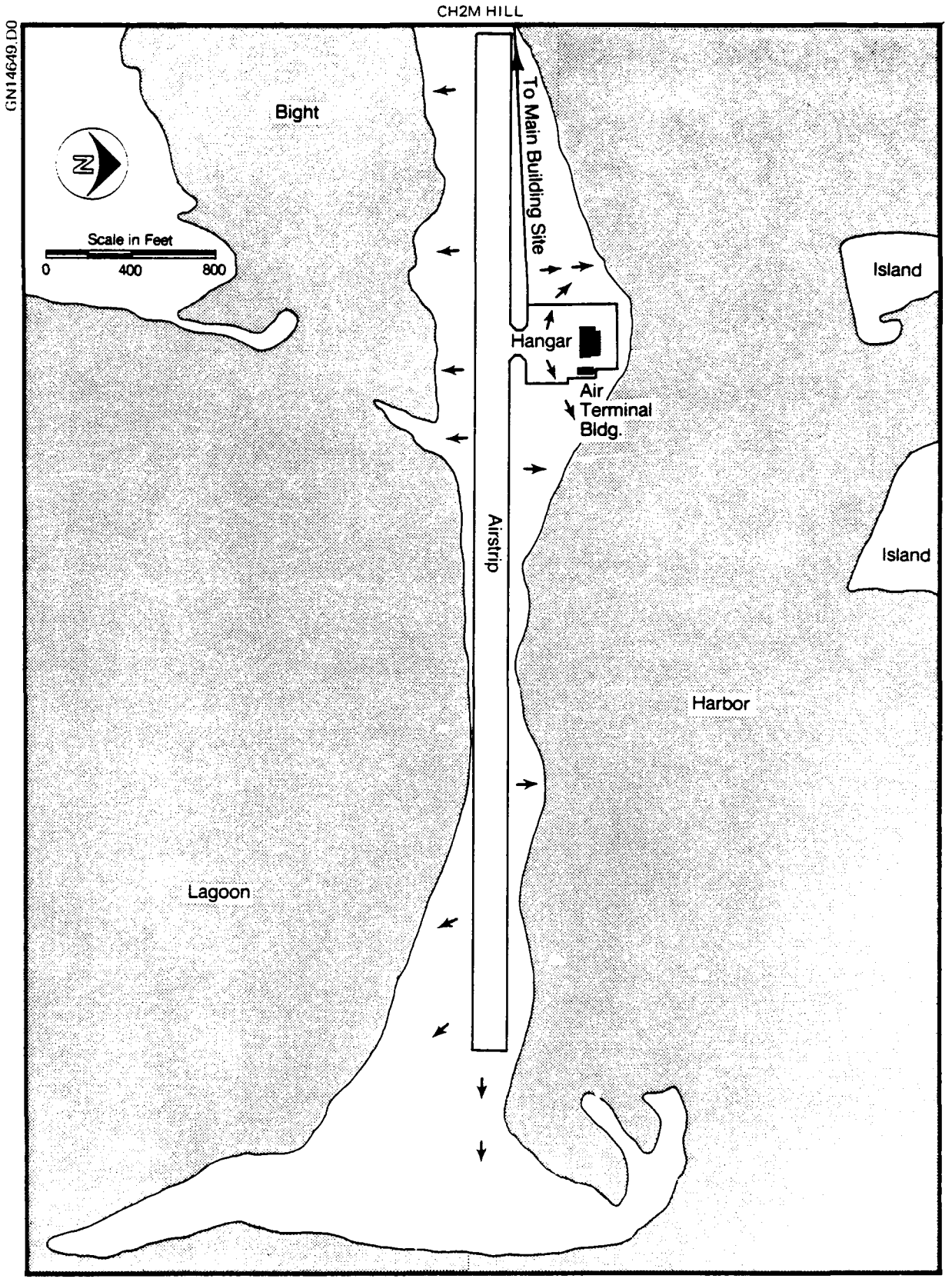

FIGURE 7. Surface drainage map of BAR-M airstrip.

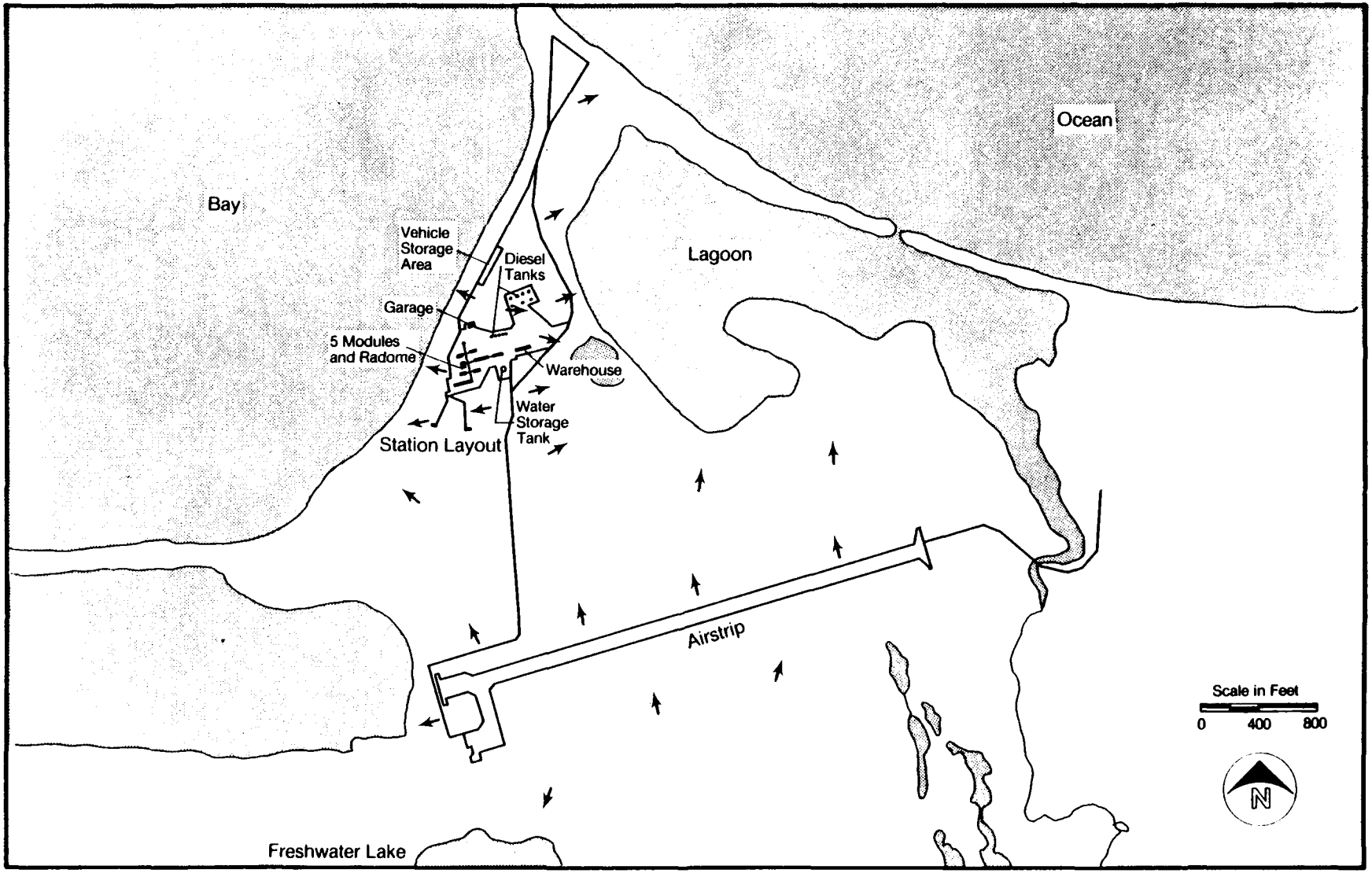

FIGURE 8. Surface drainage map of POW-3.

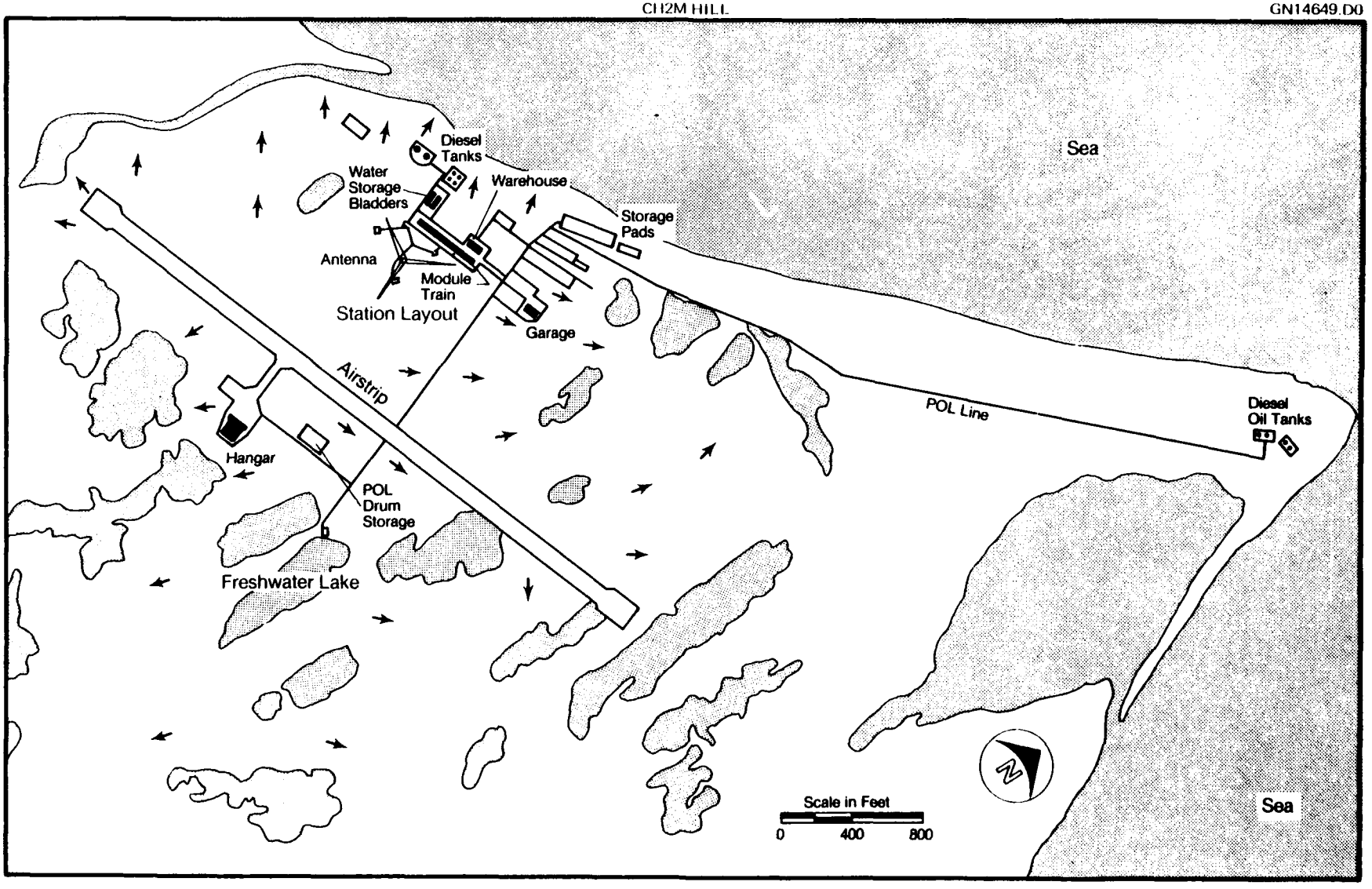

FIGURE 9. Surface drainage map of POW-2.

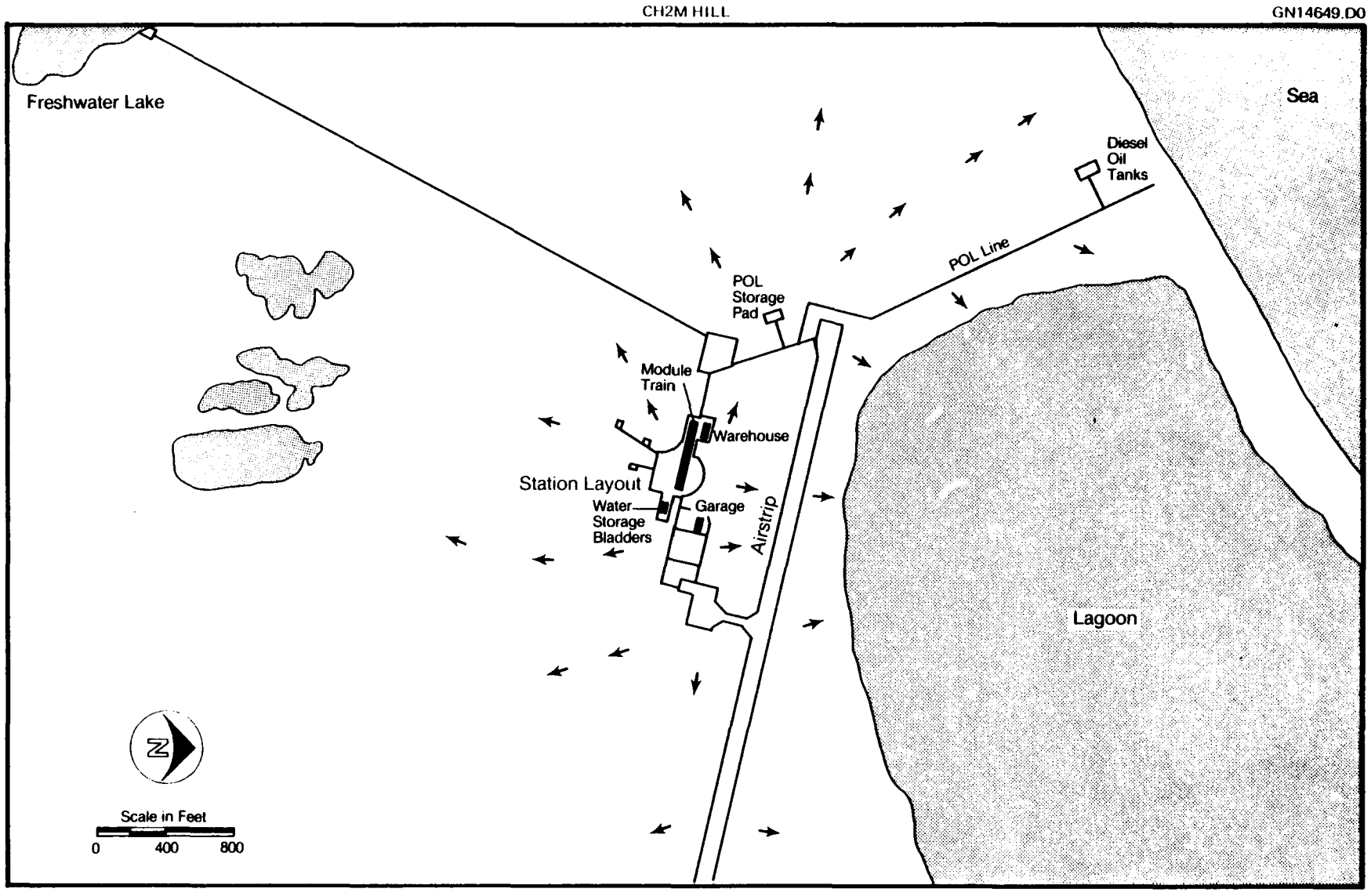

FIGURE 10. Surface drainage map of POW-1.

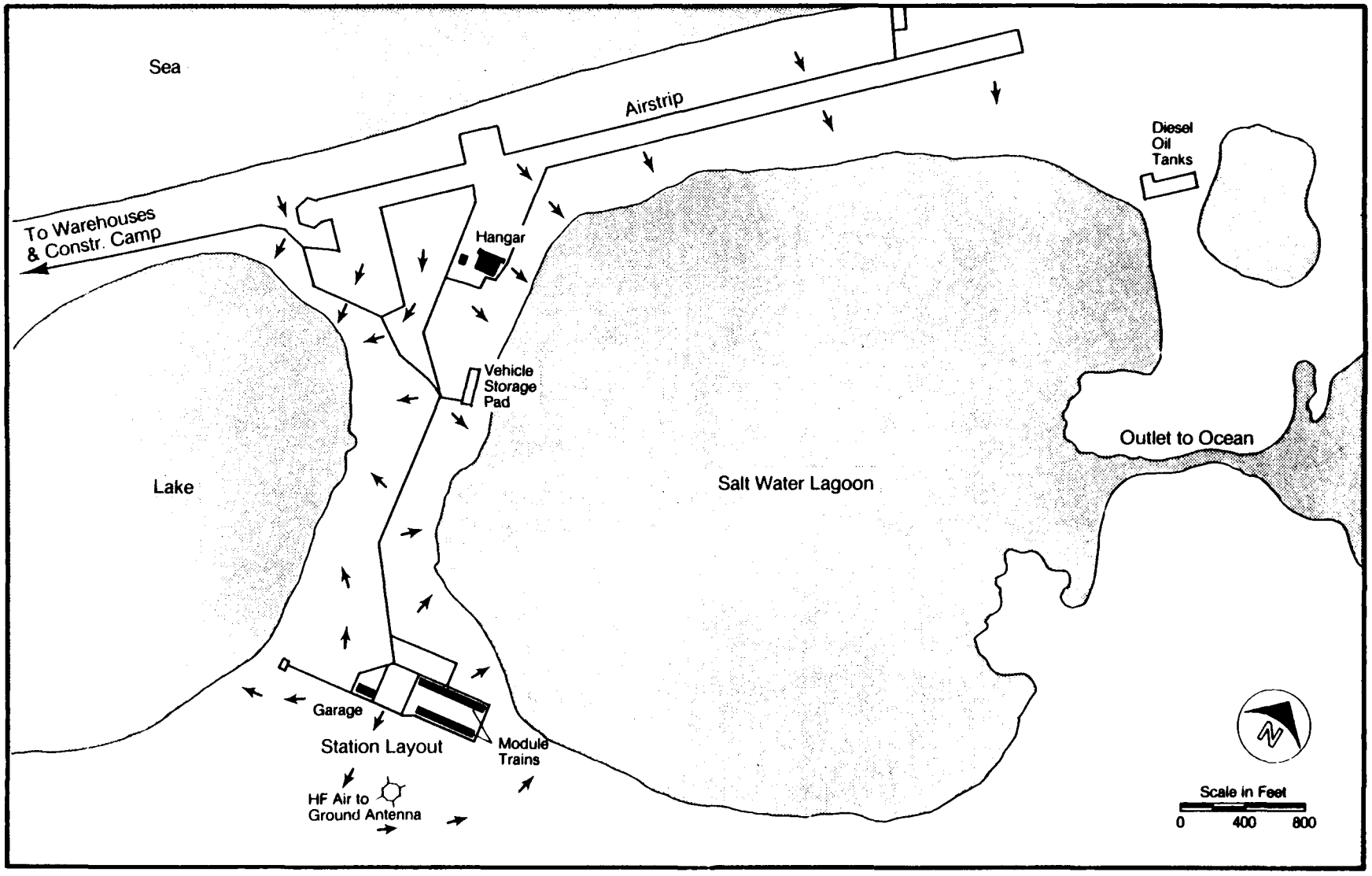

FIGURE 11. Surface drainage map of POW-M.

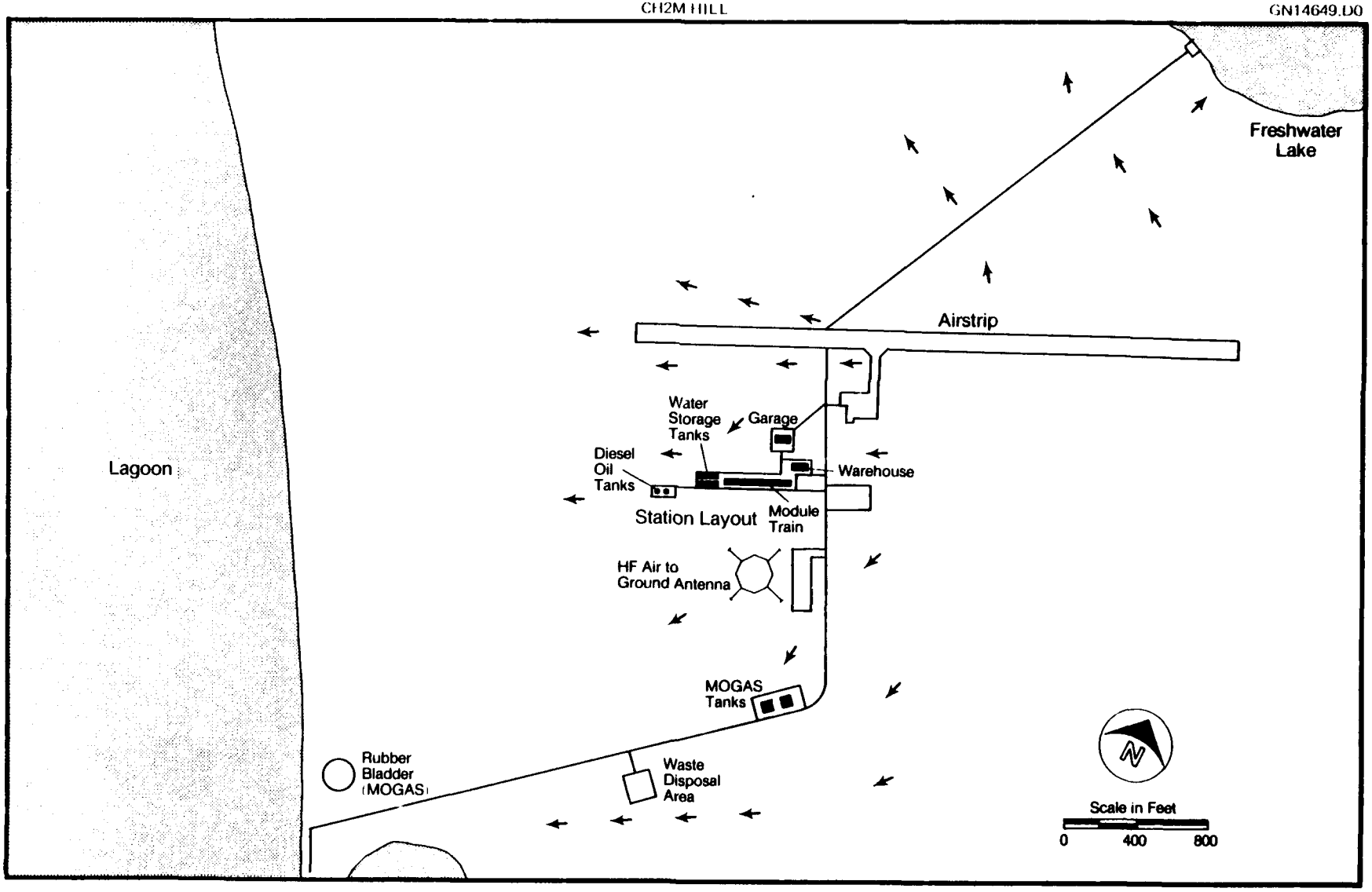

FIGURE 12. Surface drainage map of LIZ-3.

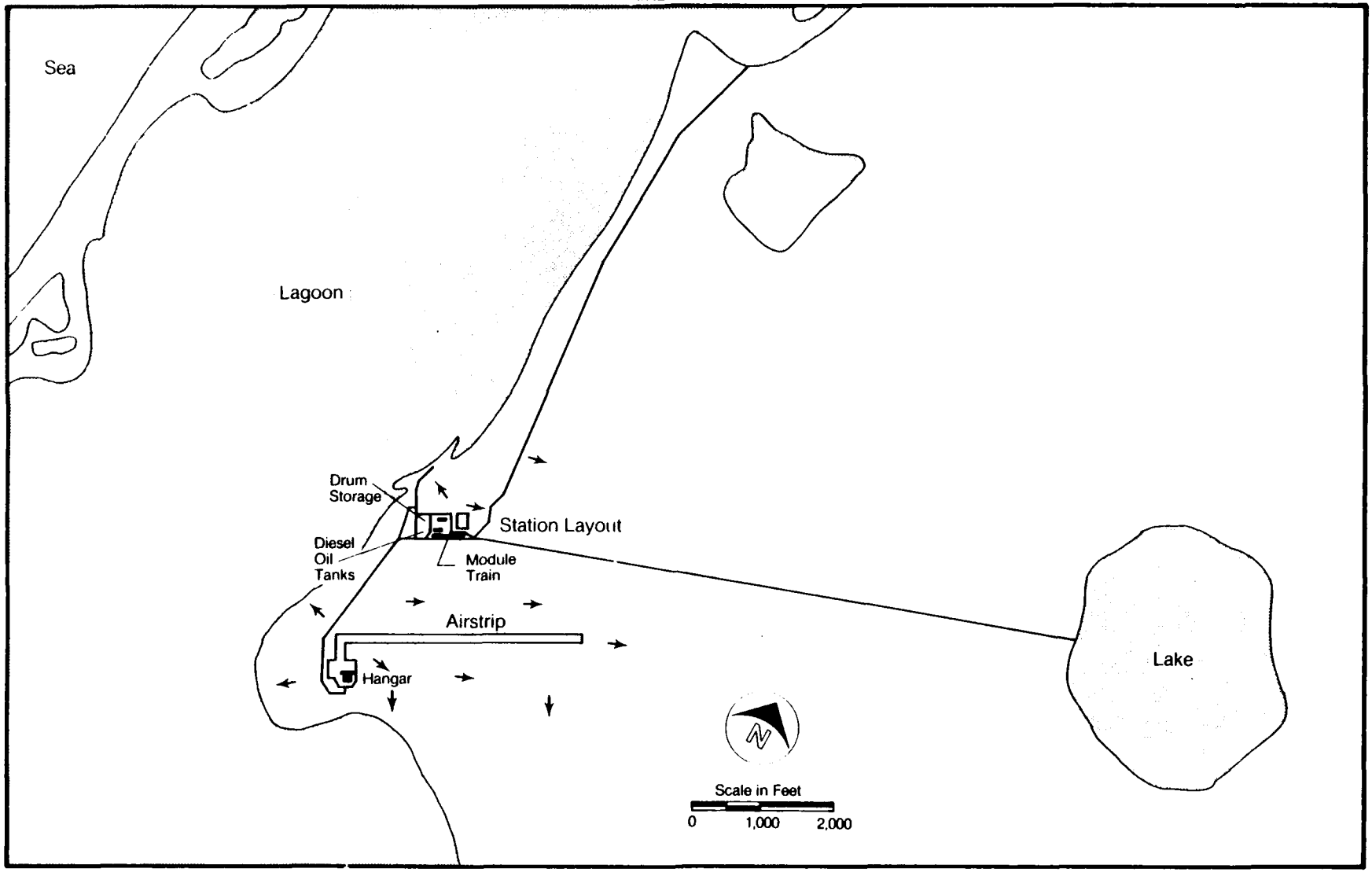

FIGURE 13. Surface drainage map of LIZ-2.

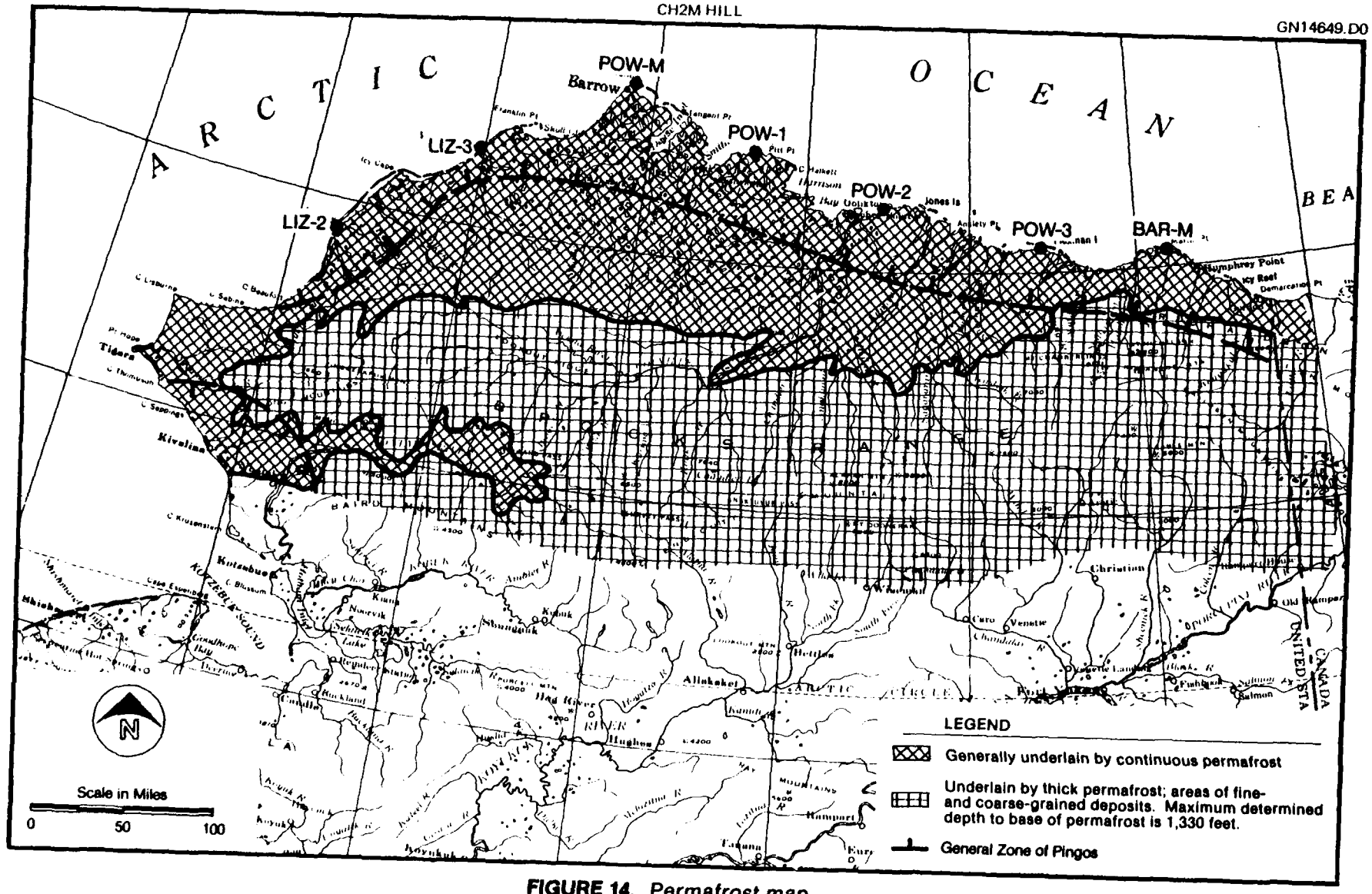

FIGURE 14. *Permafrost map.*

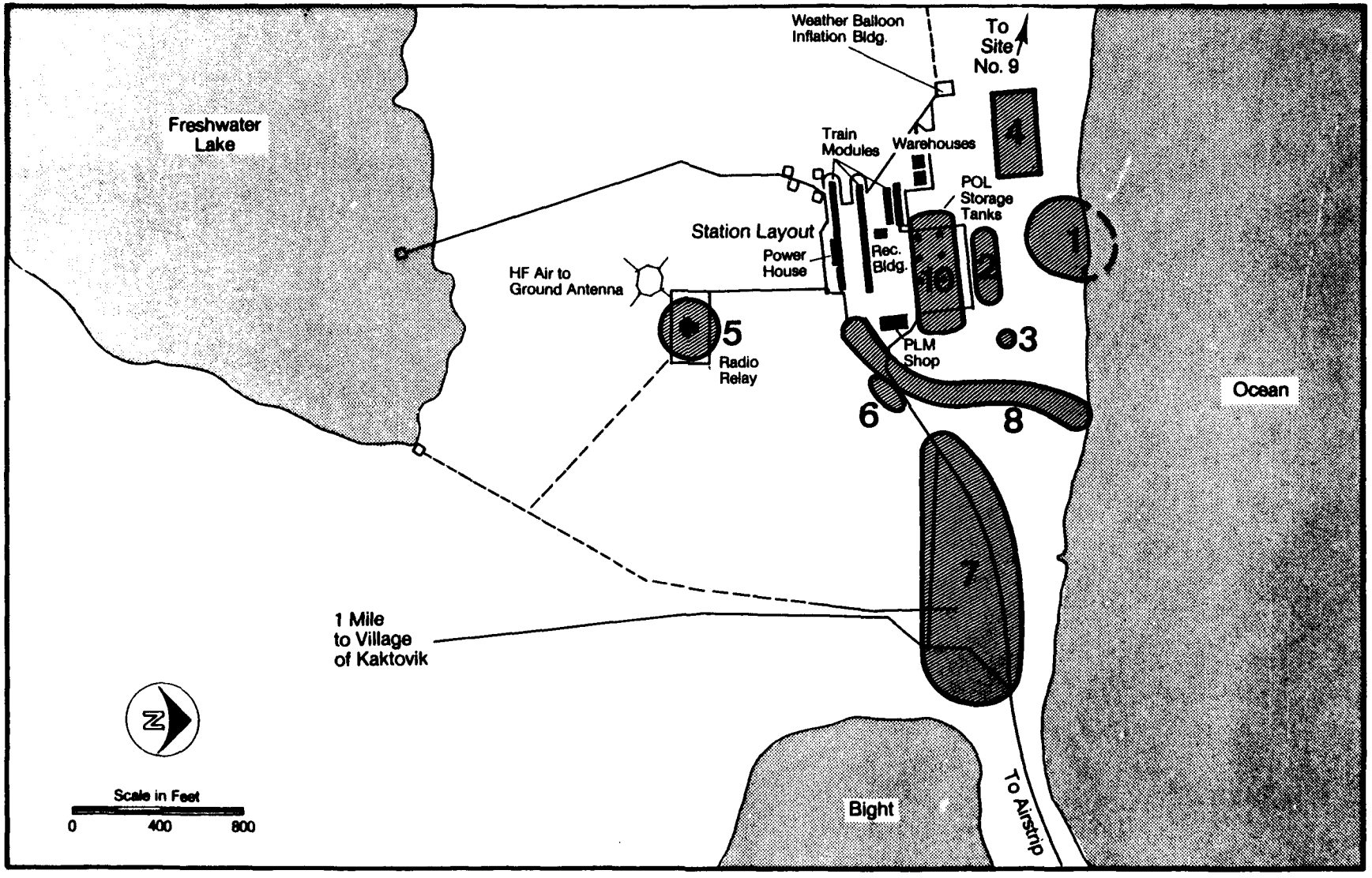

FIGURE 15. Location map of sites reviewed at BAR-M.

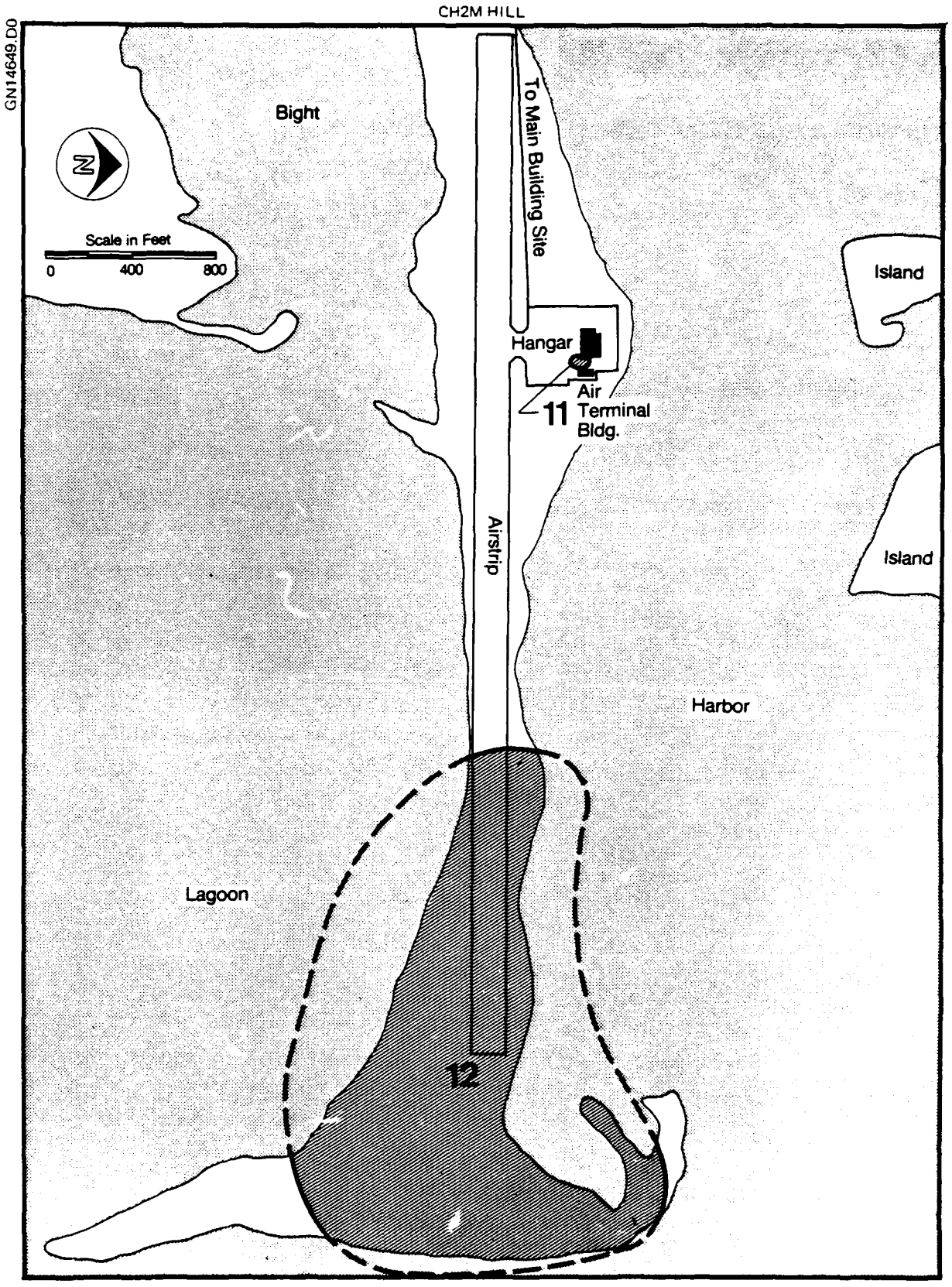

FIGURE 16. Location map of sites reviewed at BAR-M.

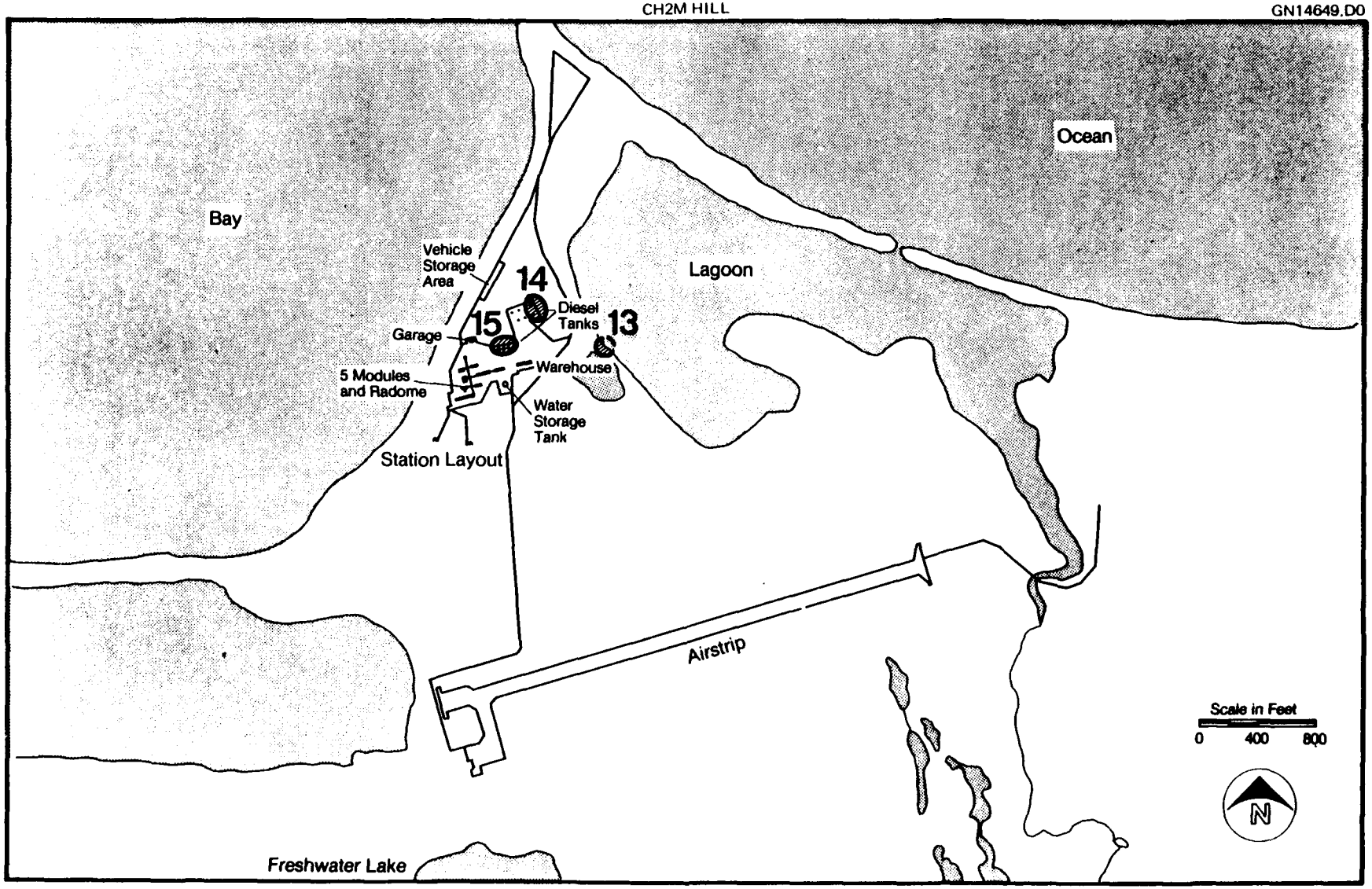

FIGURE 17. Location map of sites reviewed at POW-3.

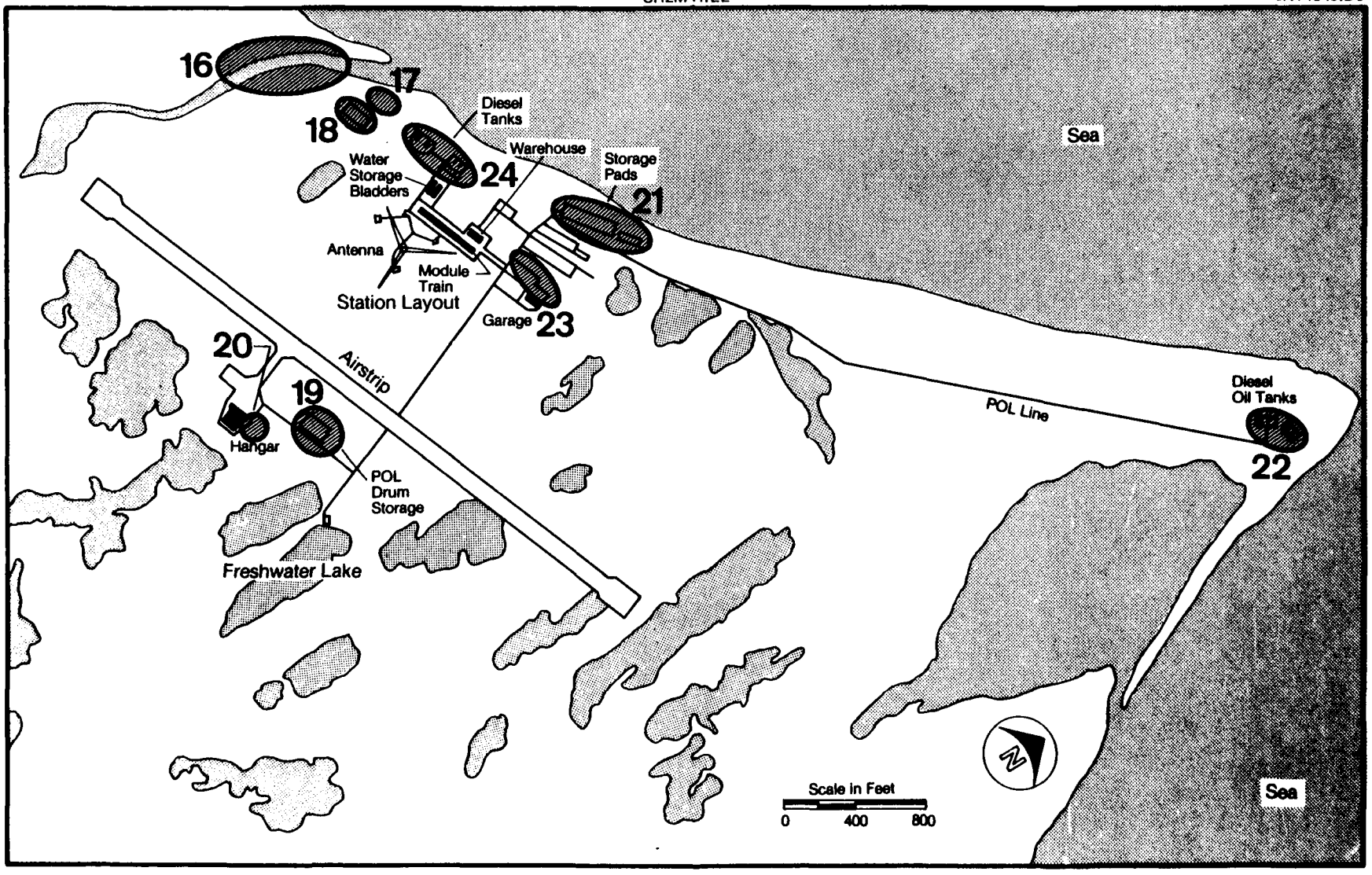

FIGURE 18. Location map of sites reviewed at POW-2.

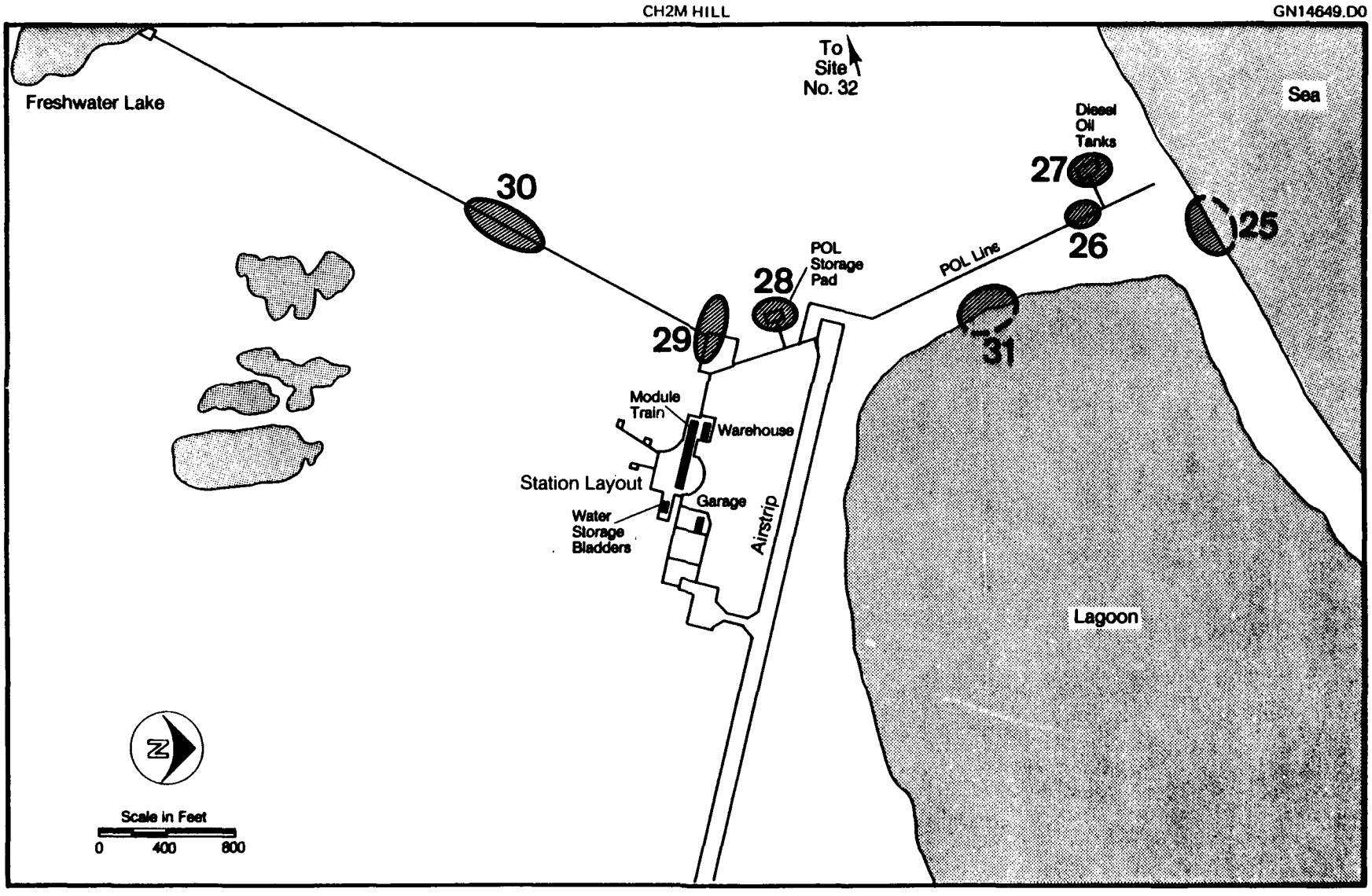

FIGURE 19. Location map of sites reviewed at POW-1.

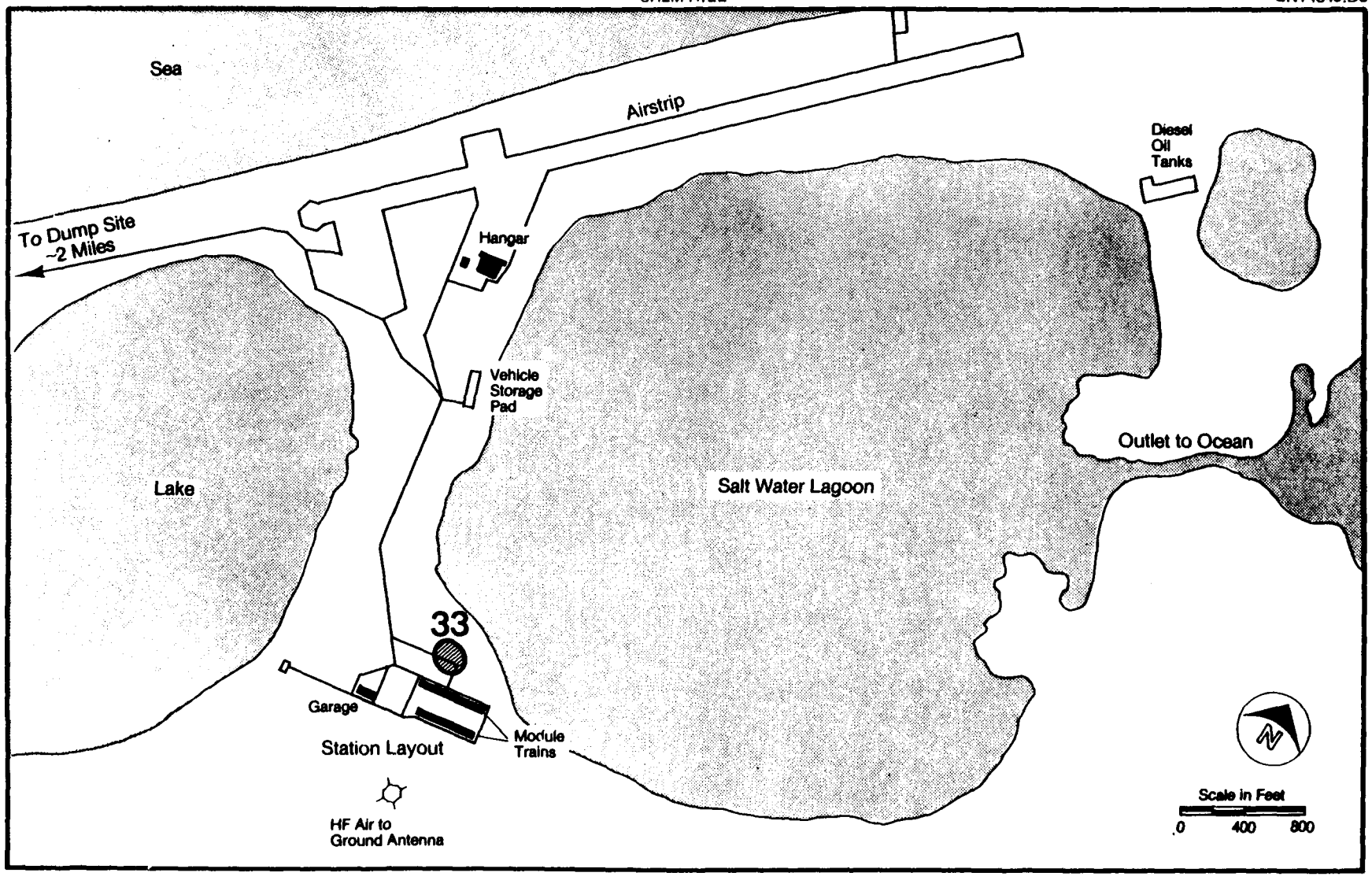

FIGURE 20. Location map of sites reviewed at POW-M.

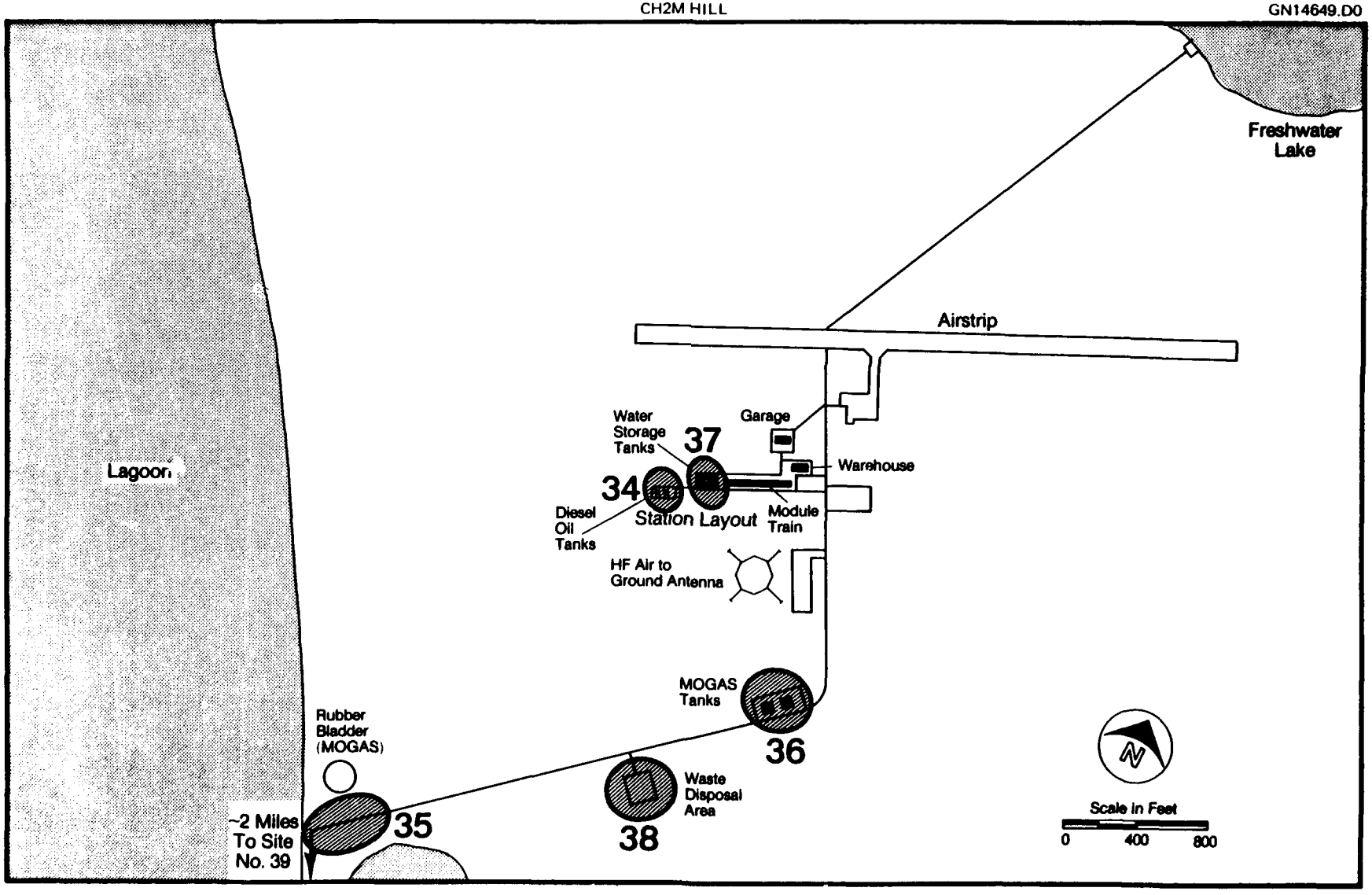

FIGURE 21. Location map of sites reviewed at LIZ-3.

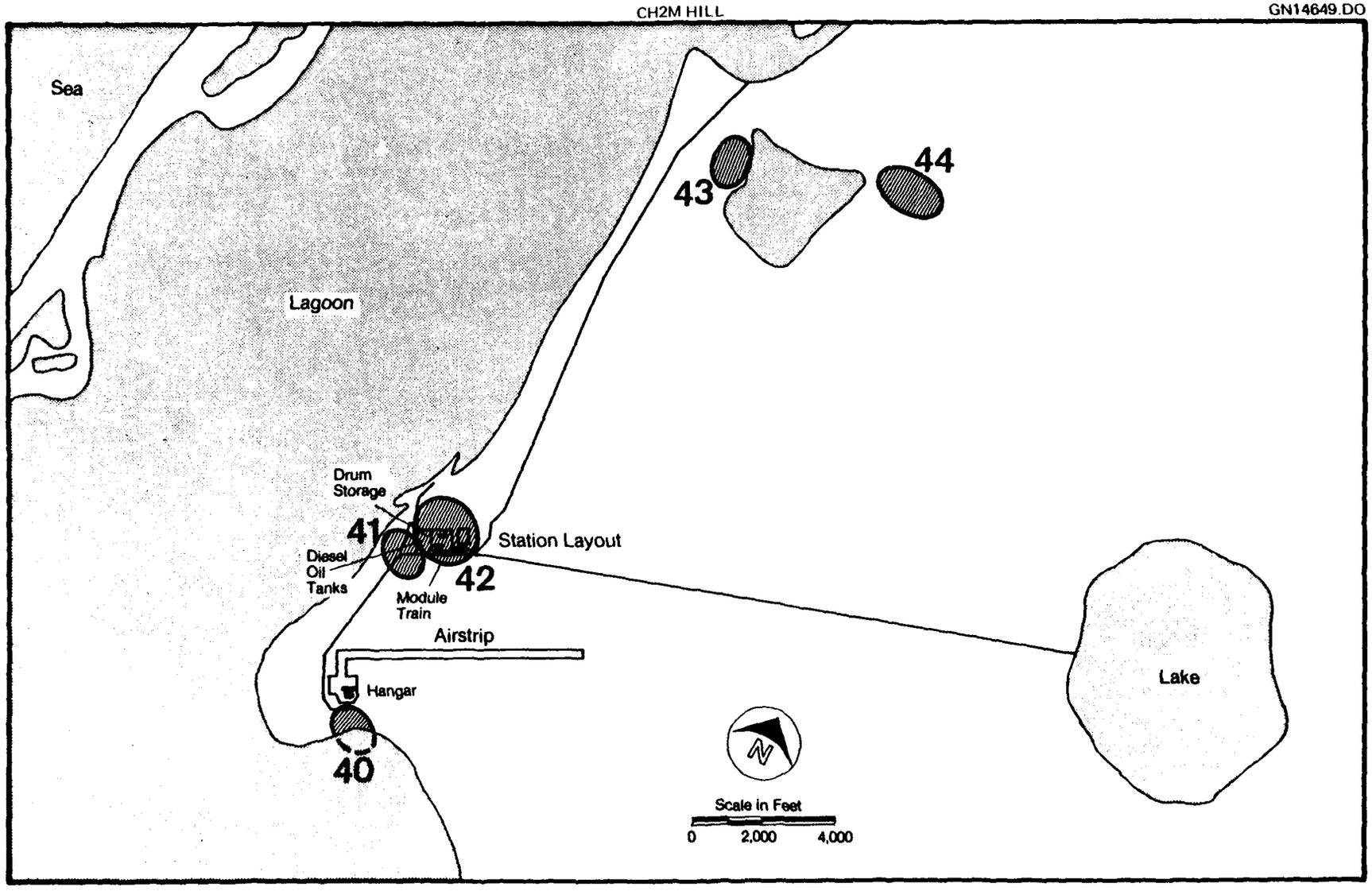

FIGURE 22. Location map of sites reviewed at LIZ-2.

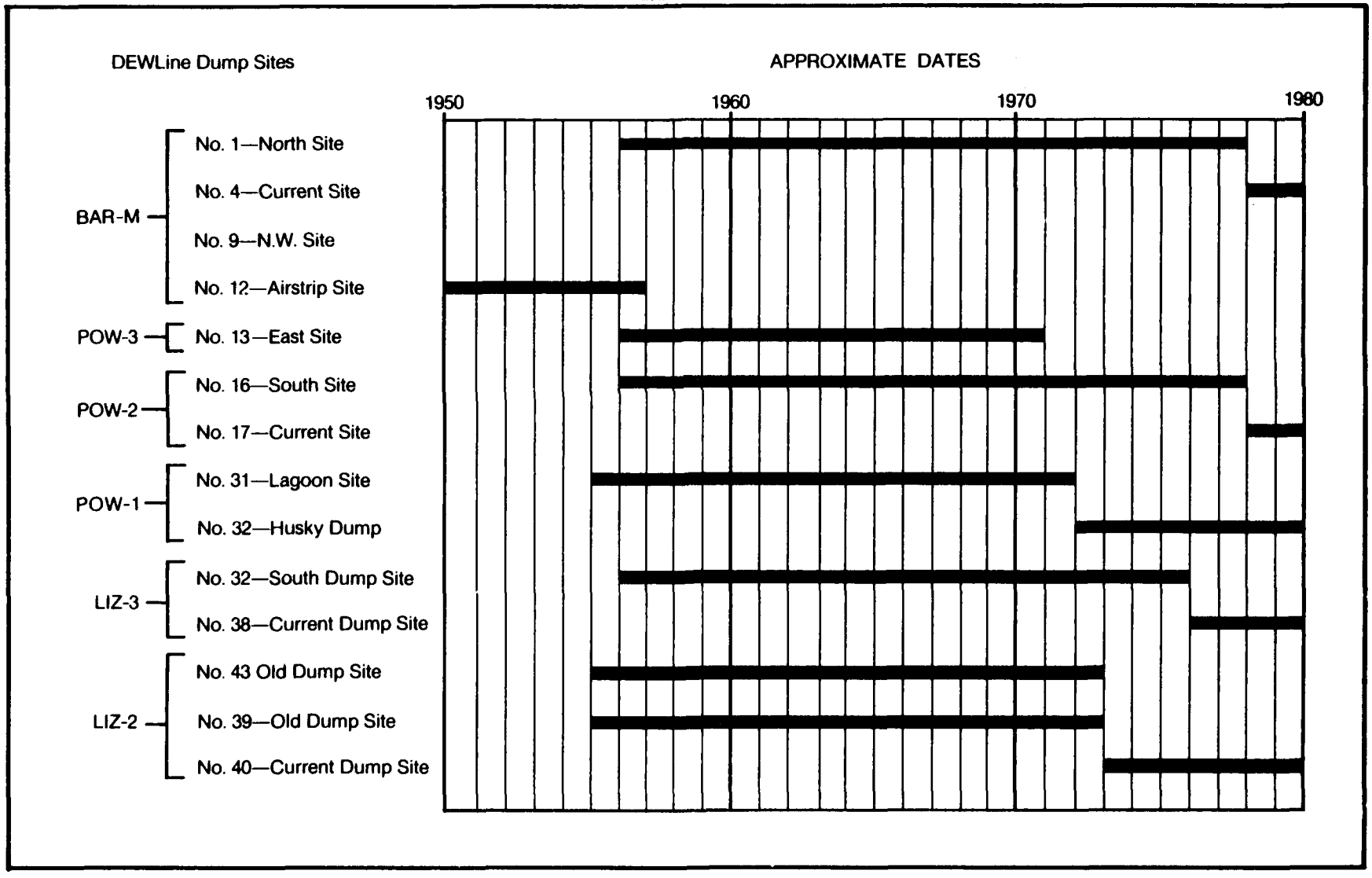

FIGURE 23. Historical summary of landfill activities on the Alaskan DEWLine.

Appendix A
PHOTOGRAPHS

GN14649.DC

FIGURE A-1. Abandoned dump site cleaned up in 1979, BAR-M Site No. 1.

FIGURE A-2. Current dump site used by both BAR-M and village of Kaktovik Site No. 4.

FIGURE A-3. Flaxman Island, POW-3, looking south.

FIGURE A-4. Dump site at Flaxman Island, POW-3 (Site No. 13).

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FIGURE A-5. Dump site at Husky Oil used by POW-1 (Site No. 32).

FIGURE A-6. Fuel-contaminated pond adjacent to fuel storage POW-1 (Site No. 28).

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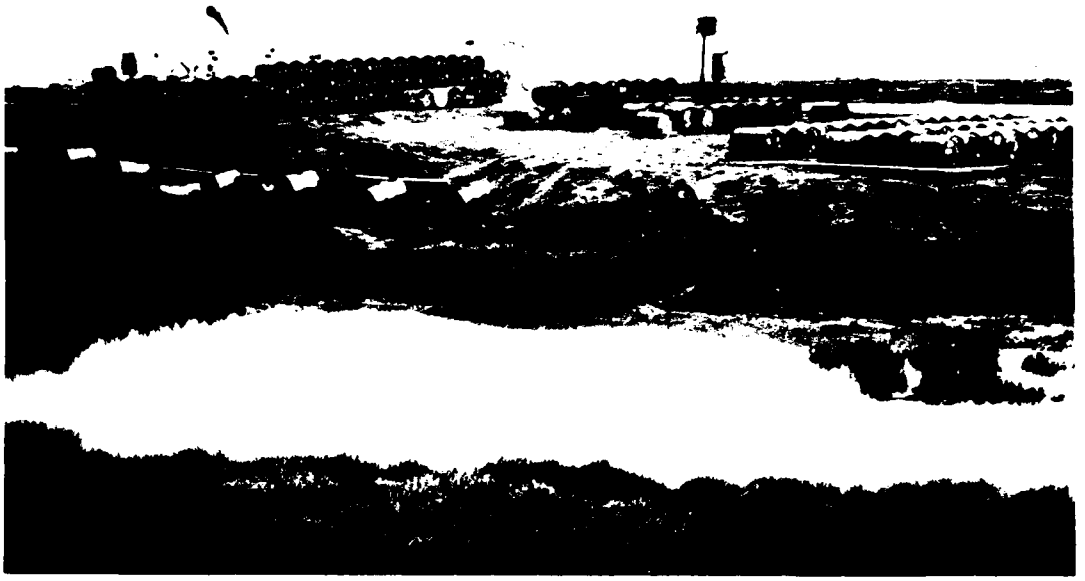

FIGURE A-7. Typical drum storage area, POW-1 (Site No. 26).

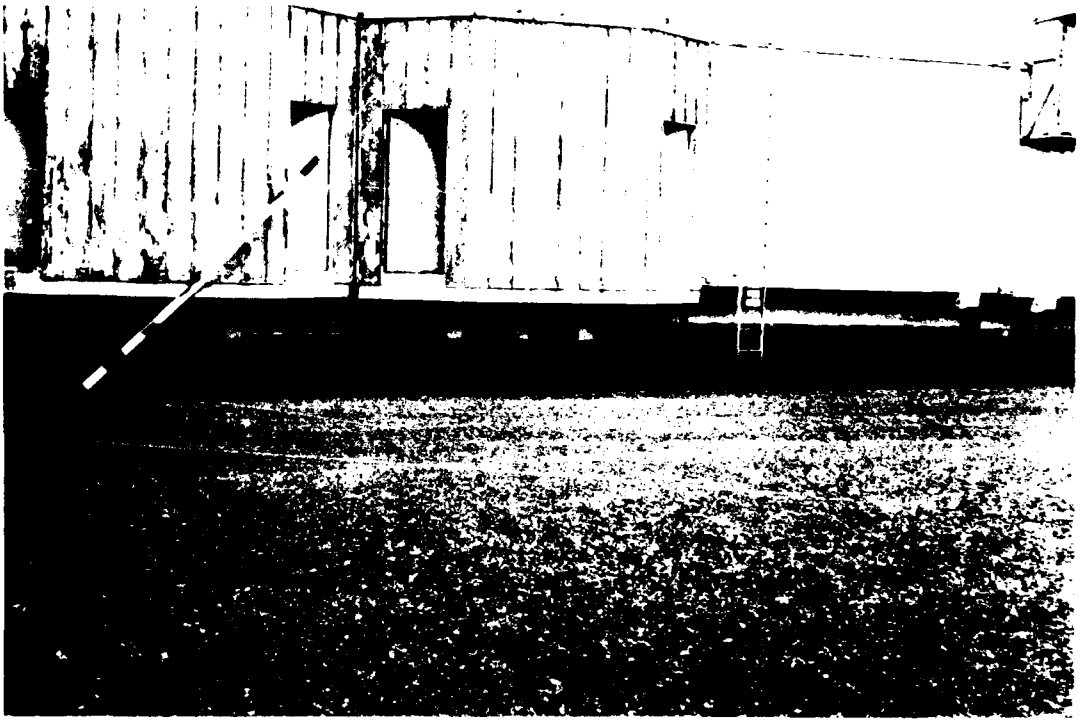

FIGURE A-8. LIZ-3 powerhouse fuel spill site (Site No. 37).

Appendix B
RESUMES OF KEY TEAM MEMBERS

GARY E. EICHLER
Hydrogeologist

Education

M.S., Engineering Geology, University of Florida, 1974
B.S., Construction and Geology, Utica College of Syracuse University, 1972

Experience

Mr. Eichler has been responsible for ground-water projects for both water supply and effluent disposal. Studies have included site selection, well design, construction services, monitoring and testing programs, determination of aquifer characteristics, and well field design. Examples of projects on which Mr. Eichler has worked include:

- Palm Coast, Florida. Conducted a test well program to determine available ground-water resources of a 250,000-person coastal development.
- Live Oak, Florida. Determination of geologic conditions at a pond failure site; identification of failure causes and recommendation for redesign of the facility compatible with site geology.
- Quaker Oats Company, Belle Glade, Florida. Test pumping and water quality sampling for an injection well facility; provided operational design criteria for the disposal system and determined aquifer characteristics.
- St. Augustine, Florida. Prepared a program of exploration and testing to locate a future supply of water; determined hydrogeologic conditions, located potential well sites, and initiated a test program.

Prior to joining CH2M HILL in 1976, Mr. Eichler was an engineering geologist with Environmental Science and Engineering, Inc., of Gainesville, Florida. Responsibilities there included project management, soils investigations, siting studies, ground-water and surface-water reports, and federal and state environmental impact studies. He has professional capabilities in the following areas.

- Hydrogeology. Water supply well location, aquifer testing, well field layout, injection well testing and monitoring program design, and well construction inspection.
- Water resources inventory. Potentiometric mapping, water yield, and availability determinations.

GARY E. EICHLER

- Site investigations. Determination of subsurface conditions, primarily in soil media. Determination of stratigraphic correlation and associated physical properties for engineering design.

- Environmental permitting. Federal, state, regional, and local permit studies associated with industrial and mining projects.

- Clay mineralogy. Clay mineral reactions primarily associated with lime stabilization for highways and other engineering projects. Participated in a Brazilian highway project and developed laboratory analysis for lime-soil reactions.

- Engineering geology. Geologic exploration, soil property determinations for engineering design, and water and earth materials interactions associated with construction.

- Geophysics. Well logging and interpretation.

Mr. Eichler directed the laboratory analysis of tropical soils to determine engineering properties and reaction potential with lime additives for a Brazilian highway project. He also assisted in the preparation and presentation of a seminar on lime stabilization sponsored by the National Lime Association.

Membership in Organizations

American Water Resources Association
Association of Engineering Geologists
Geological Society of America
Southeastern Geological Society

Publications

Engineering Properties and Lime Stabilization of Tropically Weathered Soils. M.S. thesis, Department of Geology, University of Florida. August 1974.

BRIAN H. WINCHESTER
Ecologist

Education

B.S., Wildlife Ecology, University of Florida, 1973

Experience

Mr. Winchester's responsibilities at CH2M HILL include project management, design and implementation of field sampling programs, data analysis and interpretation, impact assessment and prediction, environmental planning for impact mitigation, report preparation and review, and technical consulting at client-agency hearings. He has applied his expertise to numerous Environmental Impact Statements (EIS's), Developments of Regional Impact (DRI), and industry, power plant, and 208 studies.

- Trident Submarine Base EIS—Managed terrestrial and wetland biology subproject. Designed and directed quarterly field sampling and analyses for coastal sites in Rhode Island, Virginia, South Carolina, Georgia, and Florida. Prepared terrestrial and wetland portions of draft and final EIS.

- Gulf Intracoastal Waterway EIS—Conducted flora/fauna assessment of biota along the 300-mile Intracoastal Waterway in coastal Louisiana. Assessed impacts of maintenance dredging.

- California Lake Watershed EIS—Inventoried and mapped biotic communities for a 9-square-mile watershed in Dixie County, Florida. Assessed impacts of flood control channelization of major watercourses.

- Phosphate Industry DRI's—Managed or assisted in preparing five phosphate mine DRI's in central Florida. Helped develop mining and reclamation plans and provided technical input at client/agency hearings. Also provided biological baseline and impact assessment data for beneficiation plant sitings.

- Residential Development DRI's—Conducted biotic community inventories delineated wetlands, and prepared DRI's for three proposed residential developments in central and southern Florida.

- Wetlands Studies—Developed cost-effective, time-effective methodology for estimating the ecological value of freshwater wetlands and applied the technique to over 800 wetlands in central peninsular Florida. Assessed potential dredge and fill impacts on numerous wetlands.

- Transportation/Corridor Studies—Evaluated biological impacts associated with alternative routings of major new highways in Pinellas and Duval Counties, Florida. Assessed environmental impacts of upgrading a telephone communications corridor extending from Windermere to Tampa. Described biota and prepared a negative declaration for a proposed interstate highway interchange in Flagler County.

BRIAN H. WINCHESTER

- Power Plant Studies—Conducted study of aquatic biota entrained at a Miami generating station. Assessed impacts of blowdown on plant communities surrounding two Florida generating stations. Assisted in delineation of biotic communities for a generating station expansion in Crystal River, Florida. Prepared environmental assessments for siting power plants in western and northeastern Washington.

- Industry Studies—Managed a 2-year biological monitoring program to assess potential impacts of industrial effluents in upper Escambia Bay. Conducted baseline terrestrial and aquatic quarterly sampling for a clean fuels facility to be located adjacent to an estuarine area in Jacksonville, Florida. Predicted SO_2 and NO_x air emission impacts on vegetation for a proposed caprolactam facility in southern Alabama. Contributed to preliminary biological inventories of limestone quarry and processing plantsites in central and coastal Alabama.

- 208 Studies—Mapped and assigned value classifications for all nonmarine wetlands in Pasco, Pinellas, Hillsborough, and Manatee Counties, Florida, for Tampa area 208.

- Rare and Endangered Biota Research—Managed and designed a research project on the ecology and management of a recently rediscovered endangered mammal. Conducted numerous endangered biota inventories.

Membership in Organizations

Ecological Society of America

Publications

"An Approach to Valuation of Florida Freshwater Wetlands." *Proceedings of the Sixth Annual Conference on the Restoration and Creation of Wetlands*, 1979 (with L. D. Harris).

The Current Status of the Colonial Pocket Gopher. *Oriole* 43:33-35. 1978 (with R. S. DeLotelle).

Ecology and Management of the Colonial Pocket Gopher: A Progress Report. *Proceedings of the Rare and Endangered Wildlife Symposium*, Athens, Georgia, 1978 (with R. S. DeLotelle, J. R. Newman, and J. T. McClave).

The Ecological Effects of Arsenic Emitted from Nonferrous Smelters. Final Report for U.S. EPA, Washington, D.C. (with Francis E. Benenati and Timothy P. King) February 1976.

BARBARA J. BRITT
Engineering Aide

Education

Currently enrolled in pre-engineering program at Santa Fe Junior College, Gainesville, Florida
High School Diploma, Santa Fe High School, Alachua, Florida, 1973

Experience

Ms. Britt's primary responsibilities with the firm involve geophysical logging of water wells. Logs have included resistance, gamma ray, temperature, fluid conductivity, caliper, and flowmeter. She has also worked with a motorized depth sampler. Other responsibilities include data reduction and analysis. Examples of her project-related experience include:

- Pumping test and data analysis for the City of St. Augustine, Florida.
- Geophysical logging for the City of Pompano, Florida.
- Hydrogeologic data reduction and analysis for the Orlando Utilities Commission, Orlando, Florida.
- *Geophysical logging for the Miami-Dade Water and Sewer* Authority deep-injection wells, to a depth of 3,000 feet in a limestone aquifer.

Before joining the Water Resources Department, Ms. Britt worked in the Word Processing Department as assistant supervisor.

■ GUS ANDRESS
Civil/Sanitary Engineer

Education

M.S., Environmental Engineering, University of Southern California, 1977
B.S., Structural Engineering, California State Polytechnic University, 1975
B.S., Water Quality Engineering, California State Polytechnic University, 1975

Experience

Mr. Andress joined CH2M HILL in the Anchorage office in 1979. His primary responsibilities include providing project management and engineering support on a variety of projects within Alaska.

Examples of his project experience include the following:

- Structural design of the Ocean Cape dock and warehouse renovation at Yakutat.
- Design and construction management supervision of a viliage safe water facility at Akiachak. Total facility includes wood building, water and sewage treatment, laundry, showers, and honeybucket dump; soils investigations; water treatability studies; and water well drilling.
- Evaluation of water, sewer, and fuel oil utilities for three pump station camps for Alyeska Pipeline Service Company.
- Design of pipe supports for above-ground portion of water and sewer utilities at Barrow.
- Design of water intake structure for salmon hatchery in southwestern Alaska.
- Site investigation, review of water treatability studies for Eagle River water investigation for Municipality of Anchorage.
- Design of new water line to serve city dock for City of Homer.

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Before joining CH2M HILL, Mr. Andress was employed as a structural engineer with Arctic Structures, Inc., Anchorage. His responsibilities included structural design of shop and camp facilities for the oil support industries at Prudhoe Bay. Previous experience at the Jet Propulsion Laboratory, Pasadena, California, included extensive research and development on activated carbon wastewater treatment and coal desulfurization by low temperature chlorinolysis projects.

GUS ANDRESS

Professional Engineering Registration

Alaska, California

Membership in Organizations

Alaska Water Management Association
American Public Works Association
California Water Pollution Control Association
Water Pollution Control Federation

Publications

Preliminary Report: Activated Carbon Treatment System (ACTS) for the Treatment of Municipal Wastes. Jet Propulsion Laboratory, Pasadena, California, 1977

Coal Desulfurization by Low Temperature Chlorinolysis, Jet Propulsion Laboratory, Pasadena, California, 1978

Appendix C
OUTSIDE AGENCY CONTACTS

Appendix C
OUTSIDE AGENCY CONTACTS

1. Environmental Conservation Department, Northern Region,
   Fairbanks, Alaska 99701
   Chuck Caraway, 907/452-1714

2. Alascom, Fairbanks, Alaska 99701
   Dwayne Taylor, 211/Zenith-9000

3. Fish and Wildlife, Arctic National Refuge,
   101 12th Avenue, Fairbanks, Alaska 99701
   Don Ross, 907/452-1951

4. University of Alaska, Geophysical Institute,
   College Road, Fairbanks, Alaska 99701
   Richard Reger, 907/479-7496

5. University of Alaska, Institute of Arctic Biology,
   College Road, Fairbanks, Alaska 99701
   Bob Bursdate, 907/479-7077 and Terry Chapin, 907/479-7153

6. University of Alaska, Cold Regions Research Engineering
   Lab, College Road, Fairbanks, Alaska 99701
   Larry Johnson, 907/479-7637

7. Department of Interior,
   Anchorage, Alaska 99501
   Lou Jers, 907/271-3632

8. Arctic Environmental Information Data Center,
   707 A Street, Anchorage, Alaska 99501
   Larry Underwood, 907/279-4523

9. Department of Fish and Game, Mel Bucholtz, 907/452-1531

10. Husky Oil, Anchorage, Alaska 99501
John Schindler, 907/279-4566

11. U.S. Geological Survey,
218 E Street, Anchorage, Alaska 99501
Max Brewer, 907/276-4566

12. EPA, Alaska Operations Office,
701 C Street, Anchorage, Alaska 99501
Bill La Mororeaux. 907/271-5083

13. Department of Environmental Conservation,
Juneau, Alaska 99801
Al Boggs, 907/465-2666

14. U.S. Fish and Wildlife Service,
1011 East Tudor Street, Anchorage, Alaska 99501
Howard Metsker, 907/263-3510

Appendix D
HISTORY OF THE DEW LINE

Appendix D
HISTORY OF THE DEW LINE

In 1952, it became apparent that the possibility of destructive airborne attacks by potential enemies placed the United States and Canada in critical jeopardy. At that time, a jet aircraft could easily place our major cities within the perimeter of its A-bomb cargo before giving adequate warning of its ultimate mission.

Faced with that possibility, the military community formed a research team of handpicked scientists (code name "Summer Study Group") to solve the problem. The invention, installation, and maintenance of a distant early warning radar and communication system, positioned as close as possible to the threatening enemy air bases, was the scientists' recommendation accepted by the Air Force.

The research team, assembled at Massachusetts Institute of Technology, Lincoln Laboratories, immediately set out in the summer and fall of 1952, inventing radar and radio equipment with its associated electronic systems that could survive an environment of -60°F in winter, electric storms in the summer, fluctuating currents of the North Magnetic Pole, and the strange phenomenon of northern lights. The first test equipment was airlifted by the Air Force to Barter Island, 240 miles north of the Arctic Circle, to set up the first DEW (Distant Early Warning) Line outpost.

During the experiments, the scientists modified, designed, and changed the equipment until the team was satisfied that they had reached a feasible and practical approach to technical problems on the DEW Line.

A training center at Streator, Illinois, was developed complete with boxlike structures of the DEW Line station and the radome to simulate actual line conditions. The training center proved adequate until 1963, when it became necessary to expand in order to adjust to the added load of the Greenland sites.

In December 1952, the Defense Department took action as a result of the Summer Study Group's accomplishments and gave approval of the DEW System Defense Plan, Project 572. It was decided that the initial effort would be tested in Alaska, because two-thirds of the original proposed DEW Line would be in Canada. It was felt that we could gain time and know-how in Alaska on our own land.

The Bell System Western Electric Company became the primary contractor, with responsibility for engineering, construction, installation, and initial operation of the chain of radar and communication systems on Alaska's north coast. The schedule called for having these stations fully operational within 1 year.

The construction of the Alaska segment was a first-time event for almost every phase of the job. Construction and survival problems were a constant threat. Fortunately, many of these problems had been met and solved by the Navy, which set up a World War II camp at the northernmost point of the continent, Point Barrow, Alaska.

This camp provided working headquarters for the DEW Line project. In its heated hangar, the first of 18 modules were assembled to be placed on sled-like transports to be located at 50-mile intervals from Cape Lisburne in the west, to the Canadian border in the east.

Three types of stations were constructed: (1) the Main station consisting of approximately two 25-module building trains bridged together, equipped with rotating radar and warehouse facilities for garages, shops, etc., to provide full service and logistics support for its sector; (2) the Auxiliary station consisting of one 25-module train, equipped with rotating radar and self-support facilities; and (3) the Intermediate station consisting of a single 5-module train and essential support facilities. The "I" sites were not equipped with rotating radar; they served as anchor points for doppler type radar fences between Main and Auxiliary stations.

The Alaska Experimental Line went into operation in 1953 and proved by experience the practicality of stretching the DEW Line across the remaining 2,000 miles to the east coast of Canada at Cape Dyer.

In 1957 the original DEW Line was turned over to a civilian contractor for operation and maintenance. Until 1963, when the 28 intermediate sites were deactivated, there were 61 sites whose prime mission was radar surveillance and initiation of early warnings. In addition, the contractor was responsible for operation of three communication relay stations rearward of the DEW Line.

The original DEW Line was administratively subdivided into six sectors, each approximately 500 miles long. To maintain security, the sectors were referred to by symbols that were derived from geographical names such as: DYE for Cape Dye, BAR from Barter Island, etc. Intermediate stations on the DEW Line had alphabetic designations; BAR-A, BAR-B, etc.; the main stations had an M (Main station) following the sector name, and the auxiliary stations had a numerical designation, i.e., BAR-1, BAR-2, etc. The sector name establishes the name of the sites east of it to the next

Main station.

Since establishment of the upgraded role in military long-haul communications network, the DEW Line is now considered the DEW System. Today, the DEW Systems Office contributes to the overall TAC/NORAD air defense mission by monitoring the USAF contractor-operated radar/communications network. Currently the DEW Line consists of 31 sites, divided into five sectors, each having one main station and various numbers of auxiliary stations. Table D-1 lists the stations currently controlled by DSO.

The DEW Line still maintains its original mission of distant early warning and a communications network across the north coast of North America.

Table D-1
DEW LINE STATION LIST

Station	Geographical Name
LIZ-2	Point Lay, Alaska
LIZ-3	Wainwright, Alaska
POW-M	Point Barrow, Alaska
POW-1	Lonely, Alaska
POW-2	Oliktok, Alaska
POW-3[a]	Bullen Point (Flaxman Island)
BAR-M	Barter Island, Alaska
BAR-1	Komakuk Beach, Canada
BAR-2	Shingle Point, Canada
BAR-3	Tuktoyaktuk, Canada
BAR-4	Nicholson Peninsula, Canada
PIN-M	Cape Parry, Canada
PIN-1	Clinton Point, Canada
PIN-2	Cape Young, Canada
PIN-3	Lady Franklin Point, Canada
PIN-4	Byron Bay, Canada
CAM-M	Cambridge Bay, Canada
CAM-1	Jenny Lind Island, Canada
CAM-2	Gladman Point, Canada
CAM-3	Shepherd Bay, Canada
CAM-4	Pelly Bay, Canada
CAM-5	Mackar Inlet, Canada
FOX-M	Hall Beach, Canada
FOX-2	Longstaff Bluff, Canada
FOX-3	Dewar Lakes, Canada
FOX-4	Cape Hooper, Canada
FOX-5	Broughton Island, Canada
DYE-M	Cape Dyer, Canada
DYE-1	Qaqatoqaq, Greenland
DYE-2	Westerly Ice Cap, Greenland
DYE-3	Easterly Ice Cap, Greenland
DYE-4	Kulusuk, Greenland
DYE-5	KeFlavik, Iceland

[a]No longer active.

Appendix E
SITE HAZARD EVALUATION METHODOLOGY

HQ AIR FORCE ENGINEERING AND SERVICES CENTER
AND
USAF OCCUPATIONAL AND ENVIRONMENTAL HEALTH LABORATORY

SITE RATING METHODOLOGY

FOR

PHASE I
INSTALLATION RESTORATION PROGRAM

July 1981

SITE RATING METHODOLOGY
FOR
PHASE I INSTALLATION RESTORATION PROGRAM

1. This site rating methodology for Phase I of the Installation Restoration Program (IRP) has been jointly developed by CH_2M Hill and Engineering-Science based on experience in performing Record Searches at several Air Force installations. This standard site rating system should be used for all Air Force IRP Records Search efforts to assist in Air Force prioritization and commitment of resources for Phase II survey actions.

2. The basis for the rating system is the document developed by JRB Associates, Inc. for the EPA Hazardous Waste Enforcement office. The JRB system was modified to accurately address specific Air Force installation conditions and to provide meaningful comparison of landfills and contaminated areas other than landfills.

3. Questions pertaining to use of the Air Force Site Rating Methodology should be addressed to either Mr. Lindenberg, AFESC/DEVP, AUTOVON 970-6189 (Commercial (904) 283-6189) or Major Fishburn, AF OEHL/EC, AUTOVON 240-3305 (Commercial (512) 536-3305).

Note: Both CH_2M Hill and Engineering-Science are Engineering Support contractors for the US Air Force.

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site _____

Location _____

Owner/Operator _____

Comments _____

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet		4		
Distance to Nearest Drinking Water Well		15		
Distance to Reservation Boundary		6		
Land Use/Zoning		3		
Critical Environments		12		
Water Quality of Nearby Surface Water Body		6		
Number of Assumed Values = ____ Out of 6		SUBTOTALS	_____	_____
Percentage of Assumed Values = ____\		SUBSCORE		_____
Number of Missing Values = ____ Out of 6		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ____\				

PATHWAYS				
Evidence of Water Contamination		10		
Level of Water Contamination		15		
Type of Contamination, Soil/Biota		5		
Distance to Nearest Surface Water		4		
Depth to Groundwater		7		
Net Precipitation		6		
Soil Permeability		6		
Bedrock Permeability		4		
Depth to Bedrock		4		
Surface Erosion		4		
Number of Assumed Values = ____ Out of 10		SUBTOTALS	_____	_____
Percentage of Assumed Values = ____ \		SUBSCORE		_____
Number of Missing Values = ____ Out of 10		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ____\				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE _____

Reason for Assigned Hazardous Rating:

WASTE MANAGEMENT PRACTICES

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		7		
Hazardous Waste Quantity		7		
Total Waste Quantity		4		
Waste Incompatibility		3		
Absence of Liners or Confining Beds		6		
Use of Leachate Collection System		6		
Use of Gas Collection Systems		2		
Site Closure		8		
Subsurface Flows		7		

Number of Assumed Values = ____ Out of 9

Percentage of Assumed Values = ____%

Number of Missing and Non-Applicable Values = ____ Out of 9

Percentage of Missing and Non-Applicalbe Values = ____%

SUBTOTALS _____ _____

SUBSCORE _____

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = ____ Out of 25

Overall Percentage of Assumed Values = ____%

OVERALL SCORE _____

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

RATING FACTOR SYSTEM GUIDELINES				
RECEPTORS				
	Rating Scale Levels			
Rating Factors	0	1	2	3
Population within 1,000 Feet	0	1 to 25	26 to 100	Greater than 100
Distance to Nearest Drinking Water Well	Greater than 3 miles	1 to 3 miles	3,001 feet to 1 mile	0 to 3,000 feet
Distance to Reservation Boundary	Greater than 2 miles	1 to 2 miles	1,001 feet to 1 mile	0 to 1,000 feet
Land Use/Zoning	Completely remote (zoning not applicable)	Agricultural	Commercial or industrial	Residential
Critical Environments	Not a critical environment	Pristine natural areas	Wetlands; flood plains, and preserved areas; presence of economically important natural resources	Major habitat of an endangered or threatened species; presence of recharge area
Water Quality Designation of Nearest Surface-Water Body	Agricultural or industrial use	Recreation, propagation and management of fish and wildlife	Shellfish propagation and harvesting	Potable water supplies
	PATHWAYS			
Evidence of Water Contamination	No contamination	Indirect evidence	Positive proof from direct observation	Positive proof from laboratory analyses
Level of Water Contamination	No contamination	Low levels, trace levels, or levels less than maximum contaminant level (MCL) or EPA drinking water standards	Moderate levels or levels near MCL or EPA drinking water standards	High levels greater than MCL or EPA drinking water standards
Type of Contamination *Soil/Biota*	No contamination	Suspected contamination	Moderate contamination	Severe contamination
Distance to Nearest Surface Water	Greater than 1 mile	2,001 feet to 1 mile	501 feet to 2,000 feet	0 to 500 feet
Depth to Ground Water	Greater than 500 feet	51 to 500 feet	11 to 50 feet	0 to 10 feet
Net Precipitation	Less than −10 inches	−10 to +5 inches	+5 to +20 inches	Greater than +20 inches
Soil Permeability	Greater than 50% clay ($<10^{-6}$ cm/s)	30% to 50% clay (10^{-4} to 10^{-6} cm/s)	15% to 30% clay (10^{-2} to 10^{-4} cm/s)	0% to 15% clay ($>10^{-2}$ cm/s)
Bedrock Permeability	Impermeable ($<10^{-6}$ cm/s)	Relatively impermeable (10^{-4} to 10^{-6} cm/s)	Relatively impermeable (10^{-2} to 10^{-4} cm/s)	Very permeable ($>10^{-2}$ cm/s)
Depth to Bedrock	Greater than 60 feet	31 to 60 feet	11 to 30 feet	0 to 10 feet
Surface Erosion	None	Slight	Moderate	Severe

WASTE CHARACTERISTICS

Judgemental hazardous rating from 30 to 100 points based on the following guidelines:

Points	Condition
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

WASTE MANAGEMENT PRACTICES

	Rating Scale Levels			
Rating Factors	0	1	2	3
Record Accuracy and Ease of Access to Site	Accurate records, no unauthorized dumping	Accurate records, no barriers	Incomplete records, no barriers	No records, no barriers
Hazardous Waste Quantity	<1 ton	1 to 5 tons	5 to 20 tons	>20 tons
Total Waste Quantity	0 to 10 acre feet	11 to 100 acre feet	101 to 250 acre feet	Greater than 250 acre feet
Waste Incompatibility	No incompatible wastes are present	Present, but does not pose a hazard	Present and may pose a future hazard	Present and posing an immediate hazard
Absence of Liners or Confining Strata	Liner and confining strata	Liner or confining strata	Low quality liner or low permeability strata	No liner, no confining strata
Use of Leachate Collection Systems	Adequate collection and treatment	Inadequate collection or treatment	Inadequate collection and treatment	No collection or treatment
Use of Gas Collection Systems	Adequate collection and treatment	Collection and controlled flaring	Venting or inadequate treatment	No collection or treatment
Site Closure	Impermeable cover	Low permeability cover	Permeable cover	Abandoned site, no cover
Subsurface Flows	Bottom of landfill greater than 5 feet above high ground-water level	Bottom of landfill occasionally submerged	Bottom of fill frequently submerged	Bottom of fill located below mean ground-water level

JRB RATING SYSTEM
INTRODUCTION AND METHODOLOGY

Source: "Methodology for Rating the Hazard Potential of Waste Disposal Sites" JRB Associates, Inc., December 15, 1980

Note: This is an excerpt from the above-referenced document. For more detailed information refer to that source.

CHAPTER 1.0 INTRODUCTION

As part of EPA's nationwide waste management program, land disposal facilities containing hazardous wastes will be investigated and evaluated. Remedial action plans will be formulated for those sites presenting a significant hazard. Because resources for this task are limited, the initial focus of the work must be on the most hazardous sites. Under the auspices of EPA's Office of Enforcement, JRB Associates has devised a methodology for selecting sites for investigation based on their high potential for environmental impact.

This methodology has several advantages over other rating systems:

- It is easy to use
- It does not require users to have an extensive technical background
- It uses readily available information
- It does not require complex chemical or hydrological analyses
- It does not require users to visit the facilities in question
- It allows sites to be rated even if some data needs cannot be met.

The system consists of 31 rating factors that are divided into 4 categories: receptors; pathways; waste characteristics; and waste management practices. Factors in the receptors category determine the prime targets of environmental contamination. Factors in the pathways category assess mecha nisms for contaminant migration. Factors in the waste characteristics category examine the types of hazards posed by contaminants in the site. Factors in the waste management practices category evaluate the quality of the facility's design and operation. Each rating factor has an associated four-level scale. Because all of these factors are not of equal importance, each also has been assigned a weighing factor, called a multiplier. Raters must simply decide

which level of the rating factor's scale is most appropriate for a given site and multiply the numeric value of that level by the corresponding multiplier. The sum of the products for the 31 factors divided by the maximum possible score and multiplied by 100 is the site's rating. The ratings are on a scale of 0 to 100 and can be interpreted in relative or absolute terms.

Users can assign additional points when the rating factors do not adequately address all of the problems of a site. However, only a limited number of additional points can be assigned. This arrangement helps to ensure that a site's rating is both complete and objective.

The methodology has been designed primarily for landfills, surface impoundments, and other types of land-based storage and disposal facilities. Incinerators and waste treatment facilities, however, are beyond scope with the exception of the solid wastes produced by them.

Site ratings should be performed as part of an overall investigation procedure. Prior to a site visit, ratings can be based on published materials, public and private records, and contacts with knowledgable parties. The results of this type of rating can be used to determine which sites present the greatest potential hazard and should be visited first. A final rating can be obtained with information obtained from a visit to a site. This rating can be used as a tool to help determine how limited resources should be spent for additional sampling, which may be required to fill data gaps, and for preparing remedial action plans and/or enforcement cases for sites that represent particularly severe hazards.

The methodology's validity has been tested at sites across the country. This testing includes comparing ratings completed for the same facilities both by different raters, and before and after site visits. Officials of New Jersey's Department of Environmental Protection agreed that the ratings on 30 sites in their state were good reflections of the true hazard potential of those sites. These results show that the methodology is an exceptionally useful and efficient tool for classifying and ranking the hazard potential of land disposal facilities.

The methodology is discussed in more detail in the following four chapters. Chapter 2 describes the six basic components of the methodology. Chapter 3 identifies sources of information for the system and describes how to resolve data gaps. Chapter 4 presents the step-by-step procedure for rating sites, and Chapter 5 discusses how site ratings can be used. The three appendices provide guidance for rating sites. Finally, the glossary located at the end of this document defines all terms related to the methodology.

CHAPTER 2.0 DESCRIPTION OF THE METHODOLOGY

The site rating methodology has been developed in terms of six elements. These are:

- Factor categories
- Rating factors
- Rating scales
- Multipliers
- Additional points
- Hazard potential scores.

These elements are described below.

2.1 FACTOR CATEGORIES

In assessing the environmental impacts of any hazardous waste disposal site, four considerations must be addressed. These are:

- Receptors
- Pathways
- Waste characteristics
- Waste management practices.

Receptors refer to the biota (human and non-human) which are potentially affected by the materials released from a waste disposal site. Within this category, special attention is given to human populations and critical environments. Pathways refer to aspects of the routes by which hazardous materials can escape from a given site. The focus of this cateory is on the ease of migration of water soluble pollutants and on contamination due to the site. Waste characteristics refer to the types of hazards posed by materials in the facility in terms of both their health-related effects and their environmental mobility. Waste management practices refer to the design characteristics and management practices of a given disposal site as they

relate to the site's environmental impact. In particular, this category examines measures that are being taken to minimize exposure to hazardous wastes.

The prime importance of the factor categories is in partitioning the rating factors into manageable groups so that site ratings can be more easily and completely interpreted. This topic is discussed in greater detail in Chapter 5.

2.2 RATING FACTORS

The initial rating of a waste disposal facility is based on a set of 31 rating factors. Each of these has been assigned to one of the four factor categories. The receptors catgegory has five rating factors:

- "Residential population within 1,000 feet" and "Distance to the nearest off-site building" measure the potential for human exposure to the site
- "Distance to the nearest drinking-water well" measures the potential for human ingestion of contaminants should underlying aquifers be polluted
- "Land use/zoning" evaluates the current and anticipated uses of the surrounding area
- "Critical environments" assesses the potential for adversely affecting important biological resources and fragile natural settings.

The pathways category contains nine rating factors concerned with the potential migration and attenuation of contaminants. The primary focus is on waterborne pollutants, since they can affect the greatest number of people.

- "Distance to the nearest surface water" and "Depth to groundwater" measure the availability of pollutant migration routes
- "Soil permeability," "bedrock permeability," and "depth to bedrock" measure the potential for contaminant attenuation and ease of migration

- "Net precipitation" uses annual precipitation and evapotranspiration to estimate the amount of leachate a site produces
- "Evidence of contamination," "type of contamination," and "level of contamination" evaluate pollution currently apparent at the site.

The waste characteristics category contains rating factors which examine the waste's environmental mobility and the adverse effects it can cause.

- "Solubility," "volatility," and "physical state" measure the extent to which mobile wastes can leave the site
- "Toxicity," "radioactivity," and "persistence" assess the site's potential to cause health-related injuries
- "Ignitability," "reactivity," and "corrosiveness" evaluate the possibility of fire, explosion, or similar emergencies.

The waste management practices factor category evaluates site design and operation. This category includes eight rating factors:

- "Use of leachate collection systems," "use of gas collection systems," and "use of liners" examine features of site design for containing contamination
- "Site security" assesses the measures taken to limit site access
- "Total waste quantity" and "hazardous waste quantity" measure the quantity of waste in the site, and thus, the potential magnitude of resulting contamination
- "Waste incompatibility" evaluates the potential for incompatible wastes to combine and pose a hazard
- "Use of containers" assesses the adequacy of using containers to isolate wastes.

These factors have been selected because they are relevant to an evaluation of any land-based disposal facility. The definition and purpose of each rating factor appear in Appendix A.

2.3 RATING SCALES

For each of the factors, a four-level rating scale has been developed which provides factor-specific levels ranging from "0" (indicating no potential hazard) to "3" (indicating a high potential hazard). The rating factors and their corresponding rating scales for each of the factor categories are listed in Table 1. These scales have been defined so that the rating factors typically can be evaluated on the basis of readily available information from published materials, public and private records, contacts with knowledgeable parties, or site visits. Raters compare the information collected for a site with the limits set in the scales, and see which level of each scale most closely fits the information. The numeric value of that level is the factor rating for that factor. This process is described in more detail in Chapter 4. Additional guidance for assessing the rating scales appears in Appendix A.

2.4 MULTIPLIERS

The rating factors do not all assess the same magnitude of potential environmental impact. Consequently, a numerical value called a multiplier has been assigned to each factor in accordance with the relative magnitude of impact that it does assess. These values are multiplied, hence the term multiplier, by the appropriate factor ratings (see Section 2.3) to result in factor scores for each of the rating factors. The 31 multipliers appear as the third column from the right on the methodology's two-page Rating Form (see Figure 3).

2.5 ADDITIONAL POINTS

Special features of a facility's location, design, or operation are frequently encountered that cannot be handled satisfactorily by rating factors alone. These features might present hazards that are unusually serious, unique to the site, or not assessable by rating scales. For example, an extremely high population density near a site should be considered even more hazardous than the rating factor for "population within 1,000 feet" indicates.

Power lines running through sites containing explosive or flammable wastes, though not generally typical of waste disposal sites, should be considered a potential hazard. Finally, the function of the nearest off-site building might indicate a serious threat of human exposure exists, even though types of functions cannot be quantitatively evaluated by rating scales the way distance can be. In such cases, raters should assign a greater hazard potential score to a site than it might otherwise receive by using the additional points system. To guide raters as to the types of situations that might warrant additional points, several examples have been identified for each of the factor categories. These are:

RECEPTORS

- Use of site by local residents
- Neighboring land use
- Neighboring transportation routes, drinking water supplies, and important natural resources.

PATHWAYS

- Extreme runoff and erosion problems
- Slope instability
- Flooding
- Seismic activity.

WASTE CHARACTERISTICS

- Carcinogenicity, mutagenicity, and teratogenicity
- Infectiousness
- Low biodegradability
- High-level radioactivity.

WASTE MANAGEMENT PRACTICES

- Excessively large waste quantities
- Open burning of wastes
- Site abandonment
- Unsafe disposal practices
- Inadequate cover
- Inadequate safety precautions
- Inadequate recordkeeping.

Table 1. Rating Factors and Scales for Each of the Four Factor Categories (Continued)

RATING FACTORS	RATING SCALE LEVELS			
	0	1	2	3
RECEPTORS				
POPULATION WITHIN 1,000 FEET	0	1 TO 25	26 TO 100	GREATER THAN 100
DISTANCE TO NEAREST DRINKING-WATER WELL	GREATER THAN 3 MILES	1 TO 3 MILES	3,001 FEET TO 1 MILE	0 TO 3,000 FEET
DISTANCE TO NEAREST OFF-SITE BUILDING	GREATER THAN 2 MILES	1 TO 2 MILES	1,001 FEET TO 1 MILE	0 TO 1,000 FEET
LAND USE/ZONING	COMPLETELY REMOTE (ZONING NOT APPLICABLE)	AGRICULTURAL	COMMERCIAL OR INDUSTRIAL	RESIDENTIAL
CRITICAL ENVIRONMENTS	NOT A CRITICAL ENVIRONMENT	PRISTINE NATURAL AREAS	WETLANDS, FLOODPLAINS, AND PRESERVED AREAS	MAJOR HABITAT OF AN ENDANGERED OR THREATENED SPECIES
PATHWAYS				
EVIDENCE OF CONTAMINATION	NO CONTAMINATION	INDIRECT EVIDENCE	POSITIVE PROOF FROM DIRECT OBSERVATION	POSITIVE PROOF FROM LABORATORY ANALYSES
LEVEL OF CONTAMINATION	NO CONTAMINATION	LOW LEVELS, TRACE LEVELS, OR UNKNOWN LEVELS	MODERATE LEVELS OR LEVELS THAT CANNOT BE SENSED DURING A SITE VISIT BUT WHICH CAN BE CONFIRMED BY A LABORATORY ANALYSIS	HIGH LEVELS OR LEVELS THAT CAN BE SENSED EASILY BY INVESTIGATORS DURING A SITE VISIT
TYPE OF CONTAMINATION	NO CONTAMINATION	SOIL CONTAMINATION ONLY	BIOTA CONTAMINATION	AIR, WATER, OR FOODSTUFF CONTAMINATION
DISTANCE TO NEAREST SURFACE WATER	GREATER THAN 5 MILES	1 TO 5 MILES	1,001 FEET TO 1 MILE	0 TO 1,000 FEET
DEPTH TO GROUNDWATER	GREATER THAN 100 FEET	51 TO 100 FEET	21 TO 50 FEET	0 TO 20 FEET
NET PRECIPITATION	LESS THAN -10 INCHES	-10 TO -5 INCHES	-5 TO +20 INCHES	GREATER THAN +20 INCHES
SOIL PERMEABILITY	GREATER THAN 50% CLAY	30% TO 50% CLAY	15% TO 30% CLAY	0 TO 15% CLAY
BEDROCK PERMEABILITY	IMPERMEABLE	RELATIVELY IMPERMEABLE	RELATIVELY PERMEABLE	VERY PERMEABLE
DEPTH TO BEDROCK	GREATER THAN 60 FEET	31 TO 60 FEET	11 TO 30 FEET	0 TO 10 FEET

Table 1

RATING FACTORS AND SCALES FOR EACH OF THE FOUR FACTOR CATEGORIES

RATING FACTORS	RATING SCALE LEVELS			
	0	1	2	3
WASTE CHARACTERISTICS				
TOXICITY	SAX'S LEVEL 0 OR NFPA'S LEVEL 0	SAX'S LEVEL 1 OR NFPA'S LEVEL 1	SAX'S LEVEL 2 OR NFPA'S LEVEL 2	SAX'S LEVEL 3 OR NFPA'S LEVELS 3 OR 4
RADIOACTIVITY	AT OR BELOW BACKGROUND LEVELS	1 TO 3 TIMES BACKGROUND LEVELS	3 TO 5 TIMES BACKGROUND LEVELS	OVER 5 TIMES BACKGROUND LEVELS
PERSISTENCE	EASILY BIODEGRADABLE COMPOUNDS	STRAIGHT CHAIN HYDROCARBONS	SUBSTITUTED AND OTHER RING COMPOUNDS	METALS, POLYCYCLIC COMPOUNDS, AND HALOGENATED HYDROCARBONS
IGNITABILITY	FLASH POINT GREATER THAN 200° OR NFPA'S LEVEL 0	FLASH POINT OF 140°F. to 200°F. OR NFPA'S LEVEL 1	FLASH POINT OF 80°F. TO 140°F. OR NFPA'S LEVEL 2	FLASH POINT LESS THAN 80°F. OR NFPA'S LEVELS 3 OR 4
REACTIVITY	NFPA'S LEVEL 0	NFPA'S LEVEL 1	NFPA'S LEVEL 2	NFPA'S LEVELS 3 OR 4
CORROSIVENESS	pH OF 6 TO 9	pH OF 5 TO 6 OR 9 TO 10	pH OF 3 TO 5 OR 10 TO 12	pH OF 1 TO 3 OR 12 TO 14
SOLUBILITY	INSOLUBLE	SLIGHTLY SOLUBLE	SOLUBLE	VERY SOLUBLE
VOLATILITY	VAPOR PRESSURE LESS THAN 0.1 mm Hg	VAPOR PRESSURE OF 0.1 TO 25 mm Hg	VAPOR PRESSURE OF 78 TO 25 mm Hg	VAPOR PRESSURE GREATER THAN 78 mm Hg
PHYSICAL STATE	SOLID	SLUDGE	LIQUID	GAS
WASTE MANAGEMENT PRACTICES				
SITE SECURITY	SECURE FENCE WITH LOCK	SECURITY GUARD BUT NO FENCE	REMOTE LOCATION OR BREACHABLE FENCE	NO BARRIERS
HAZARDOUS WASTE QUANTITY	0 TO 250 TONS	251 TO 1,000 TONS	1,001 TO 2000 TONS	GREATER THAN 2,000 TONS
TOTAL WASTE QUANTITY	0 TO 10 ACRE FEET	11 TO 100 ACRE FEET	101 TO 250 ACRE FEET	GREATER THAN 250 ACRE FEET
WASTE INCOMPATIBILITY	NO INCOMPATIBLE WASTES ARE PRESENT	PRESENT, BUT DOES NOT POSE A HAZARD	PRESENT AND MAY POSE A FUTURE HAZARD	PRESENT AND POSING AN IMMEDIATE HAZARD
USE OF LINERS	CLAY OR OTHER LINER RESISTENT TO ORGANIC COMPOUNDS	SYNTHETIC OR CONCRETE LINER	ASPHALT BASE LINER	NO LINER USED
USE OF LEACHATE COLLECTION SYSTEMS	ADEQUATE COLLECTION AND TREATMENT	INADEQUATE COLLECTION OR TREATMENT	INADEQUATE COLLECTION AND TREATMENT	NO COLLECTION OR TREATMENT
USE OF GAS COLLECTION SYSTEMS	ADEQUATE COLLECTION AND TREATMENT	COLLECTION AND CONTROLLED FLARING	VENTING OR INADEQUATE TREATMENT	NO COLLECTION OR TREATMENT
USE AND CONDITION OF CONTAINERS	CONTAINERS ARE USED AND APPEAR TO BE IN GOOD CONDITION	CONTAINERS ARE USED BUT A FEW ARE LEAKING	CONTAINERS ARE USED BUT MANY ARE LEAKING	NO CONTAINERS ARE USED

While this list is by no means exhaustive, and other examples may be encountered by raters using the methodology, it does include the more commonly occurring situations. Appendix B provides guidance on the number of additional points that should be assigned for these situations.

In order to maintain the objectivity of the rating methodology while allowing the assignment of additional points, the following limits are placed on the number of additional points that may be assigned in each factor category:

- Receptors 50 points
- Pathways 25 points
- Waste characteristics 20 points
- Waste management practices 30 points.

The number of additional points allowed in each factor category is a function of the total available rating factor points and the relative importance of the category.

The actual procedure for assigning additional points is outlined in Chapter 4.

2.6 HAZARD POTENTIAL SCORES

The result of a site rating is a set of five hazard potential scores. These scores are:

- Overall score
- Receptors subscore
- Pathways subscore
- Waste characteristics subscore
- Waste management practices subscore.

The overall score is based on all the rating factors and additional points that are used to rate a site. Each subscore is based on those rating factors

and additional points in that factor category which are used to rate a site. All of these scores are normalized so that they are on a scale of 0 to 100. The normalization procedure is described in Chapter 4. Associated with every hazard potential score is a percentage of missing and assumed data. These percentages flag scores that are based on large amounts of missing data and, generally, measure the reliability of the scores. Chapter 5 describes how to interpret these scores.

Appendix F
SITE ASSESSMENT AND RATING FORMS

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: Site No. 1 Old Dump Site
Location: BAR-M
Owner/Operator: BAR-M
Comments: Original Dump Site

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	0	15	0	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	0	3	0	9
Critical Environments	1	12	12	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = 0 Out of 6		SUBTOTALS	40	138
Percentage of Assumed Values = 0 %		SUBSCORE		29
Number of Missing Values = 0 Out of 6		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = 6 %				

PATHWAYS					
Evidence of Water Contamination		1	10	10	30
Level of Water Contamination	Assumed	1	15	15	45
Type of Contamination, Soil/Biota		1	5	5	15
Distance to Nearest Surface Water		3	4	12	12
Depth to Groundwater		3	7	21	21
Net Precipitation		1	6	6	18
Soil Permeability	Assumed	1	6	6	18
Bedrock Permeability	N/A	—	4	—	—
Depth to Bedrock	N/A	—	4	—	—
Surface Erosion		2	4	8	12
Number of Assumed Values = 2 Out of 10			SUBTOTALS	83	171
Percentage of Assumed Values = 20 %			SUBSCORE		49
Number of Missing Values = 2 Out of 10			(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = 20 %					

WASTE CHARACTERISTICS

Site No. 1

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating:

Interviews reported materials disposed of in landfill included hazardous materials

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	1	7	7	21
Total Waste Quantity	Assumed	0	4	0	12
Waste Incompatibility		1	3	3	9
Absence of Liners or Confining Beds		1	6	6	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		2	8	16	24
Subsurface Flows		0	7	0	21
			SUBTOTALS	77	150
			SUBSCORE		51

Number of Assumed Values = 2 Out of 9
Percentage of Assumed Values = 22%
Number of Missing and Non-Applicable Values = 0 Out of 9
Percentage of Missing and Non-Applicable Values = 0%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 4 Out of 25
Overall Percentage of Assumed Values = 16%

OVERALL SCORE 45

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: Site No. 2 Sewage Lagoon
Location: BAR-M
Owner/Operator: BAR-M
Comments: Lagoon receives liquid waste generated by site

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	0	15	0	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	0	3	0	9
Critical Environments	1	12	12	36
Water Quality of Nearby Surface Water Body	1	6	6	18
		SUBTOTALS	40	138
		SUBSCORE		29

Number of Assumed Values = 0 Out of 6
Percentage of Assumed Values = 0%
Number of Missing Values = 0 Out of 6
Percentage of Missing Values = 0%
(Factor Score Divided by Maximum Score and Multiplied by 100)

PATHWAYS					
Evidence of Water Contamination		0	10	0	30
Level of Water Contamination		0	15	0	45
Type of Contamination, Soil/Biota		0	5	0	15
Distance to Nearest Surface Water		3	4	12	12
Depth to Groundwater		3	7	21	21
Net Precipitation		1	6	6	18
Soil Permeability	Assumed	1	6	6	18
Bedrock Permeability	N/A	–	4	–	–
Depth to Bedrock	N/A	–	4	–	–
Surface Erosion		2	4	8	12
			SUBTOTALS	53	171
			SUBSCORE		31

Number of Assumed Values = 1 Out of 10
Percentage of Assumed Values = 10%
Number of Missing Values = 2 Out of 10
Percentage of Missing Values = 20%
(Factor Score Divided by Maximum Score and Multiplied by 100)

WASTE CHARACTERISTICS

Site No. 2

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 40

Reason for Assigned Hazardous Rating:
Lagoon receives all liquid waste generated by site

WASTE MANAGEMENT PRACTICES

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site	2	7	14	21
Hazardous Waste Quantity	0	7	0	21
Total Waste Quantity	0	4	0	12
Waste Incompatibility	0	3	0	9
Absence of Liners or Confining Beds	1	6	6	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection Systems	3	2	6	6
Site Closure	—	8	—	—
Subsurface Flows	0	7	0	21
		SUBTOTALS	44	126
		SUBSCORE		35

Number of Assumed Values = 0 Out of 9
Percentage of Assumed Values = 0%
Number of Missing and Non-Applicable Values = 1 Out of 9
Percentage of Missing and Non-Applicalbe Values = 11%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 1 Out of 25
Overall Percentage of Assumed Values = 4%

OVERALL SCORE 34

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: Site No. 3 Waste POL
Location: Bar-M
Owner/Operator: BAR-M
Comments: Site apprars to be used to dump waste POL

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	0	15	0	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	0	3	0	9
Critical Environments	1	12	12	36
Water Quality of Nearby Surface Water Body	1	6	6	18
		SUBTOTALS	40	138
		SUBSCORE		29

Number of Assumed Values = 0 Out of 6
Percentage of Assumed Values = 0 %
Number of Missing Values = 0 Out of 6
Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

PATHWAYS					
Evidence of Water Contamination		2	10	20	30
Level of Water Contamination	Assumed	1	15	15	45
Type of Contamination, Soil/Biota		1	5	5	15
Distance to Nearest Surface Water		3	4	12	12
Depth to Groundwater		3	7	21	21
Net Precipitation		1	6	6	18
Soil Permeability	Assumed	1	6	6	18
Bedrock Permeability	N/A	—	4	—	—
Depth to Bedrock	N/A	—	4	—	—
Surface Erosion		2	4	8	12
			SUBTOTALS	93	171
			SUBSCORE		54

Number of Assumed Values = 2 Out of 10
Percentage of Assumed Values = 20 %
Number of Missing Values = 2 Out of 10
Percentage of Missing Values = 20 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

WASTE CHARACTERISTICS

Site No. 3

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating: Observed Contamination

WASTE MANAGEMENT PRACTICES

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity	0	7	0	21
Total Waste Quantity	0	4	0	12
Waste Incompatibility	0	3	0	9
Absence of Liners or Confining Beds	1	6	6	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection Systems	3	2	6	6
Site Closure N/A	—	8	—	—
Subsurface Flows	0	7	0	21
		SUBTOTALS	51	126
		SUBSCORE		41

Number of Assumed Values = 0 Out of 9
Percentage of Assumed Values = 0%
Number of Missing and Non-Applicable Values = 1 Out of 9
Percentage of Missing and Non-Applicalbe Values = 11%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25
Overall Percentage of Assumed Values = 8%

OVERALL SCORE 44

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: Site No. 4
Location: Bar-M
Owner/Operator: Bar-M
Comments: Site is used by station and native village of Kaktovik

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	0	15	0	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	0	3	0	9
Critical Environments	1	12	12	36
Water Quality of Nearby Surface Water Body	1	6	6	18
		SUBTOTALS	40	138
		SUBSCORE		29

Number of Assumed Values = 0 Out of 6
Percentage of Assumed Values = 0 %
Number of Missing Values = 0 Out of 6
Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

PATHWAYS				
Evidence of Water Contamination	2	10	20	30
Level of Water Contamination	1	15	15	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability	1	6	6	18
Bedrock Permeability	–	4	–	–
Depth to Bedrock	–	4	–	–
Surface Erosion	2	4	8	12
		SUBTOTALS	93	171
		SUBSCORE		54

Number of Assumed Values = 2 Out of 10
Percentage of Assumed Values = 20 %
Number of Missing Values = 2 Out of 10
Percentage of Missing Values = 20 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

WASTE CHARACTERISTICS

Site No. 4

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating:
Village of Kaktovik dumping is uncontrolled

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	1	7	7	21
Total Waste Quantity	Assumed	0	4	0	12
Waste Incompatibility		1	3	3	9
Absence of Liners or Confining Beds		1	6	6	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		2	8	16	24
Subsurface Flows		0	7	0	21
			SUBTOTALS	77	150
			SUBSCORE		51

Number of Assumed Values = 2 Out of 9
Percentage of Assumed Values = 22%
Number of Missing and Non-Applicable Values = 0 Out of 9
Percentage of Missing and Non-Applicalbe Values = 0%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 4 Out of 25
Overall Percentage of Assumed Values = 16%

OVERALL SCORE 47

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: Site No. 8 -- Drainage Cut Contamination
Location: Bar-M
Owner/Operator: Bar-M
Comments: Contamination of Drainage Cut by Discharge from Power House

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	0	15	0	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	0	3	0	9
Critical Environments	1	12	12	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = 0 Out of 6		SUBTOTALS	36	138
Percentage of Assumed Values = 0 %		SUBSCORE		26
Number of Missing Values = 0 Out of 6		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = 0 %				

PATHWAYS					
Evidence of Water Contamination		2	10	20	30
Level of Water Contamination	Assumed	1	15	15	45
Type of Contamination, Soil/Biota		1	5	5	15
Distance to Nearest Surface Water		3	4	12	12
Depth to Groundwater		3	7	21	21
Net Precipitation		1	6	6	18
Soil Permeability	Assumed	1	6	6	18
Bedrock Permeability	N/A	–	4	–	–
Depth to Bedrock	N/A	–	4	–	–
Surface Erosion		3	4	12	12
Number of Assumed Values = 2 Out of 10			SUBTOTALS	97	171
Percentage of Assumed Values = 20 %			SUBSCORE		57
Number of Missing Values = 2 Out of 10			(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = 20 %					

WASTE CHARACTERISTICS

Site No. 8

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating:
Discharge from Power House caused red/orange discharge

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site	N/A	—	7	—	—
Hazardous Waste Quantity		0	7	0	21
Total Waste Quantity		0	4	0	12
Waste Incompatibility		0	3	0	9
Absence of Liners or Confining Beds		1	6	6	18
Use of Leachate Collection System	N/A	—	6	—	—
Use of Gas Collection Systems	N/A	—	2	—	—
Site Closure	N/A	—	8	—	—
Subsurface Flows		0	7	0	21

Number of Assumed Values = 0 Out of 9
Percentage of Assumed Values = 0%
Number of Missing and Non-Applicable Values = 4 Out of 9
Percentage of Missing and Non-Applicalbe Values = 44%

SUBTOTALS 6 81/7
SUBSCORE
(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25
Overall Percentage of Assumed Values = 8%

OVERALL SCORE 36

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: Site No. 9 Old Dump Site - NW
Location: BAR-M
Owner/Operator: BAR-M
Comments: Site located in natural drainage cut - Has been cleaned up

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	0	15	0	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	0	3	0	9
Critical Environments	1	12	12	36
Water Quality of Nearby Surface Water Body	1	6	6	18
		SUBTOTALS	40	138
		SUBSCORE		29

Number of Assumed Values = 0 Out of 6
Percentage of Assumed Values = 0 %
Number of Missing Values = 0 Out of 6
Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	0	5	0	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability Assumed	1	6	6	18
Bedrock Permeability N/A	-	4	-	-
Depth to Bedrock N/A	-	4	-	-
Surface Erosion	2	4	8	12
		SUBTOTALS	53	171
		SUBSCORE		31

Number of Assumed Values = 1 Out of 10
Percentage of Assumed Values = 10 %
Number of Missing Values = 2 Out of 10
Percentage of Missing Values = 10 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

WASTE CHARACTERISTICS

Site No. 9

Hazardous Rating: Judgmental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating:

Old dump site received everything generated at station

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	1	7	7	21
Total Waste Quantity	Assumed	0	4	0	12
Waste Incompatibility		1	3	3	9
Absence of Liners or Confining Beds		1	6	6	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		2	8	16	24
Subsurface Flows		0	7	0	21
			SUBTOTALS	77	150
			SUBSCORE		51

Number of Assumed Values = 2 Out of 9

Percentage of Assumed Values = 22%

Number of Missing and Non-Applicable Values = 0 Out of 9

Percentage of Missing and Non-Applicalbe Values = 0%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 3 Out of 25

Overall Percentage of Assumed Values = 12%

OVERALL SCORE 40

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: Site No. 12 Old Dump Site
Location: East End of Air Strip - BAR-M
Owner/Operator: BAR-M
Comments: Old dump site used prior to and during construction - since cleaned up

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	0	15	0	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	0	3	0	9
Critical Environments	1	12	12	36
Water Quality of Nearby Surface Water Body	1	6	6	18
		SUBTOTALS	40	138
		SUBSCORE		30

Number of Assumed Values = 0 Out of 6
Percentage of Assumed Values = 0%
Number of Missing Values = 0 Out of 6
Percentage of Missing Values = 0%
(Factor Score Divided by Maximum Score and Multiplied by 100)

PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	0	5	0	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability Assumed	1	6	6	18
Bedrock Permeability N/A	—	4	—	—
Depth to Bedrock N/A	—	4	—	—
Surface Erosion	2	4	8	12
		SUBTOTALS	53	195
		SUBSCORE		31

Number of Assumed Values = 1 Out of 10
Percentage of Assumed Values = 10%
Number of Missing Values = 2 Out of 10
Percentage of Missing Values = 20%
(Factor Score Divided by Maximum Score and Multiplied by 100)

WASTE CHARACTERISTICS

Site No. 12

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating: Dump received everything generated as waste

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	1	7	7	21
Total Waste Quantity	Assumed	0	4	0	12
Waste Incompatibility		1	3	3	9
Absence of Liners or Confining Beds		1	6	6	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure	N/A	—	8	—	—
Subsurface Flows		0	7	0	21
			SUBTOTALS	61	126
			SUBSCORE		48

Number of Assumed Values = 2 Out of 9
Percentage of Assumed Values = 22%
Number of Missing and Non-Applicable Values = 1 Out of 9
Percentage of Missing and Non-Applicalbe Values = 11%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 3 Out of 25
Overall Percentage of Assumed Values = 12%

OVERALL SCORE 39

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: Site No. 13 Old Dump Site, EAST
Location: East of Site - POW-3
Owner/Operator: USAF
Comments: This site was deactivated in 1971

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	0	15	0	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	0	3	0	9
Critical Environments	1	12	12	36
Water Quality of Nearby Surface Water Body Assumed	1	6	6	18
Number of Assumed Values = 1 Out of 6		SUBTOTALS	36	138
Percentage of Assumed Values = 17%		SUBSCORE		26
Number of Missing Values = 0 Out of 6		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = 0%				

PATHWAYS					
Evidence of Water Contamination	Assumed	1	10	10	30
Level of Water Contamination	Assumed	1	15	15	45
Type of Contamination, Soil/Biota	Assumed	1	5	5	15
Distance to Nearest Surface Water		3	4	12	12
Depth to Groundwater		3	7	21	21
Net Precipitation		1	6	6	18
Soil Permeability	Assumed	1	6	6	18
Bedrock Permeability	N/A	—	4	—	—
Depth to Bedrock	N/A	—	4	—	—
Surface Erosion		1	4	4	12
Number of Assumed Values = 4 Out of 10			SUBTOTALS	79	171
Percentage of Assumed Values = 40%			SUBSCORE		46
Number of Missing Values = 2 Out of 10			(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = 20%					

WASTE CHARACTERISTICS

Site No. 13

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating:
Site dump received allwaste generated by site

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	1	7	7	21
Total Waste Quantity	Assumed	0	4	0	12
Waste Incompatibility	Assumed	1	3	3	9
Absence of Liners or Confining Beds		1	6	6	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure	Assumed	3	8	24	24
Subsurface Flows		0	7	0	21
			SUBTOTALS	85	150
			SUBSCORE		57

Number of Assumed Values = 4 Out of 9
Percentage of Assumed Values = 44%
Number of Missing and Non-Applicable Values = 0 Out of 9
Percentage of Missing and Non-Applicalbe Values = 0%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 9 Out of 25
Overall Percentage of Assumed Values = 36%

OVERALL SCORE 45

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: Site No. 16 Old Dump Site
Location: Northwest Corner POW-2
Owner/Operator: POW-2
Comments: Site has been cleaned-up

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	0	15	6	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	0	3	0	9
Critical Environments	1	12	12	36
Water Quality of Nearby Surface Water Body Assumed	1	6	6	18
		SUBTOTALS	36	138
		SUBSCORE		26

Number of Assumed Values = 1 Out of 6
Percentage of Assumed Values = 17%
Number of Missing Values = 0 Out of 6
Percentage of Missing Values = 0%
(Factor Score Divided by Maximum Score and Multiplied by 100)

PATHWAYS				
Evidence of Water Contamination	1	10	10	30
Level of Water Contamination Assumed	1	15	15	45
Type of Contamination, Soil/Biota Assumed	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability Assumed	1	6	6	18
Bedrock Permeability N/A	—	4	—	—
Depth to Bedrock N/A	—	4	—	—
Surface Erosion	1	4	4	12
		SUBTOTALS	79	171
		SUBSCORE		46

Number of Assumed Values = 2 Out of 10
Percentage of Assumed Values = 30%
Number of Missing Values = 2 Out of 10
Percentage of Missing Values = 20%
(Factor Score Divided by Maximum Score and Multiplied by 100)

WASTE CHARACTERISTICS

Site No. 16

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating: Old Dump Site Received Everything generated by site

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	1	7	7	21
Total Waste Quantity	Assumed	0	4	0	12
Waste Incompatibility	Assumed	1	3	3	9
Absence of Liners or Confining Beds		1	6	6	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		3	8	24	24
Subsurface Flows		0	7	0	21
			SUBTOTALS	85	150
			SUBSCORE		57

Number of Assumed Values = 3 Out of 9
Percentage of Assumed Values = 33%
Number of Missing and Non-Applicable Values = 0 Out of 9
Percentage of Missing and Non-Applicaibe Values = 0%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 6 Out of 25
Overall Percentage of Assumed Values = 24%

OVERALL SCORE 45

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: Site No. 17 Current Dump Site
Location: Northwest Corner - POW-2
Owner/Operator: POW-2
Comments: Site Receives incinerator Ash and other debris including batteries, some metal, paints

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	0	15	0	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	0	3	0	9
Critical Environments	1	12	12	36
Water Quality of Nearby Surface Water Body Assumed	1	6	6	18
		SUBTOTALS	36	138
		SUBSCORE		26

Number of Assumed Values = 1 Out of 6
Percentage of Assumed Values = 17 %
Number of Missing Values = 0 Out of 6
Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

PATHWAYS				
Evidence of Water Contamination	1	10	10	30
Level of Water Contamination Assumed	1	15	15	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability Assumed	1	6	6	18
Bedrock Permeability N/A	—	4	—	-
Depth to Bedrock N/A	—	4	—	—
Surface Erosion	1	4	4	12
		SUBTOTALS	79	171
		SUBSCORE		46

Number of Assumed Values = 2 Out of 10
Percentage of Assumed Values = 20 %
Number of Missing Values = 2 Out of 10
Percentage of Missing Values = 20 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

WASTE CHARACTERISTICS

Site No. 17

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 40

Reason for Assigned Hazardous Rating:
Site is controlled, should be receiving no hazardous materials

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	0	7	0	21
Total Waste Quantity		0	4	0	12
Waste Incompatibility	Assumed	0	3	0	9
Absence of Liners or Confining Beds		1	6	6	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure	N/A	—	8	—	—
Subsurface Flows		0	7	0	21
			SUBTOTALS	51	126
			SUBSCORE		40

Number of Assumed Values = 2 Out of 9
Percentage of Assumed Values = 22%
Number of Missing and Non-Applicable Values = 1 Out of 9
Percentage of Missing and Non-Applicalbe Values = 11%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 5 Out of 25
Overall Percentage of Assumed Values = 20%

OVERALL SCORE 39

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: Site No. 20 - Fuel Oil Spill
Location: Adjacent to Hangar POW-2
Owner/Operator: POW-2
Comments: POL Line broke spilling ~300 gallons of fuel oil

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	0	15	0	45
Distance to Reservation Boundary	2	6	12	18
Land Use/Zoning	0	3	0	9
Critical Environments	1	12	12	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = 0 Out of 6		SUBTOTALS	30	138
Percentage of Assumed Values = 0 %		SUBSCORE		22
Number of Missing Values = 0 Out of 6		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = 0 %				

PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	0	5	0	15
Distance to Nearest Surface Water	2	4	8	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability Assumed	1	6	6	18
Bedrock Permeability N/A	—	4	—	—
Depth to Bedrock N/A	—	4	—	—
Surface Erosion	1	4	4	12
Number of Assumed Values = 1 Out of 10		SUBTOTALS	45	171
Percentage of Assumed Values = 10 %		SUBSCORE		26
Number of Missing Values = 2 Out of 10		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = 20 %				

WASTE CHARACTERISTICS

Site No. 20

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating:
Oil Spill

WASTE MANAGEMENT PRACTICES

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site	N/A	7	—	—
Hazardous Waste Quantity	0	7	0	21
Total Waste Quantity	0	4	0	12
Waste Incompatibility	0	3	0	9
Absence of Liners or Confining Beds	1	6	6	18
Use of Leachate Collection System	N/A	6	—	—
Use of Gas Collection Systems	N/A	2	—	—
Site Closure	N/A	8	—	—
Subsurface Flows	0	7	0	21
		SUBTOTALS	6	81
		SUBSCORE		7

Number of Assumed Values = 0 Out of 9
Percentage of Assumed Values = 0 %
Number of Missing and Non-Applicable Values = 4 Out of 9
Percentage of Missing and Non-Applicalbe Values = 44 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 1 Out of 25
Overall Percentage of Assumed Values = 4 %

OVERALL SCORE 26

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: Site No. 25 - Sewage Disposal Area
Location: Beach North of Site, POW-1
Owner/Operator: POW-1
Comments: Sewage Disposed here prior to 1972

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	0	15	0	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	0	3	0	9
Critical Environments	1	12	12	36
Water Quality of Nearby Surface Water Body Assumed	1	6	6	18
		SUBTOTALS	40	138
		SUBSCORE		29

Number of Assumed Values = 1 Out of 6
Percentage of Assumed Values = 17%
Number of Missing Values = 0 Out of 6
Percentage of Missing Values = 0%
(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	0	5	0	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability Assumed	1	6	6	18
Bedrock Permeability N/A	-	4	-	-
Depth to Bedrock N/A	-	4	-	-
Surface Erosion	1	4	4	12
		SUBTOTALS	49	171
		SUBSCORE		29

Number of Assumed Values = 1 Out of 10
Percentage of Assumed Values = 10%
Number of Missing Values = 2 Out of 10
Percentage of Missing Values = 20%
(Factor Score Divided by Maximum Score and Multiplied by 100)

WASTE CHARACTERISTICS

Site No. 25

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 30

Reason for Assigned Hazardous Rating: Domestic sewage disposal site.

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	0	7	0	21
Total Waste Quantity	Assumed	0	4	0	12
Waste Incompatibility	Assumed	0	3	0	9
Absence of Liners or Confining Beds		1	6	6	18
Use of Leachate Collection System	N/A	—	6	—	—
Use of Gas Collection Systems	N/A	—	2	—	—
Site Closure	N/A	—	8	—	—
Subsurface Flows		0	7	0	21
			SUBTOTALS	27	102
			SUBSCORE		26

Number of Assumed Values = 3 Out of 9
Percentage of Assumed Values = 33%
Number of Missing and Non-Applicable Values = 3 Out of 9
Percentage of Missing and Non-Applicalbe Values = 33%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 5 Out of 25
Overall Percentage of Assumed Values = 20%

OVERALL SCORE 28

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: Site No. 28 - POL Storage Area
Location: West of Site - POW-1
Owner/Operator: POW-1
Comments: Storage area for petroleum products; evidence of surface water contamination

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	0	15	0	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	0	3	0	9
Critical Environments	1	12	12	36
Water Quality of Nearby Surface Water Body Assumed	1	6	6	18
		SUBTOTALS	40	138
		SUBSCORE		29

Number of Assumed Values = 1 Out of 6
Percentage of Assumed Values = 17%
Number of Missing Values = 0 Out of 6
Percentage of Missing Values = 0%
(Factor Score Divided by Maximum Score and Multiplied by 100)

PATHWAYS					
Evidence of Water Contamination		2	10	20	30
Level of Water Contamination	Assumed	2	15	30	45
Type of Contamination, Soil/Biota	Assumed	2	5	10	15
Distance to Nearest Surface Water		2	4	8	12
Depth to Groundwater		3	7	21	21
Net Precipitation		1	6	6	18
Soil Permeability	Assumed	1	6	6	18
Bedrock Permeability	N/A	—	4	—	—
Depth to Bedrock	N/A	—	4	—	—
Surface Erosion		1	4	4	12
			SUBTOTALS	105	171
			SUBSCORE		61

Number of Assumed Values = 3 Out of 10
Percentage of Assumed Values = 30%
Number of Missing Values = 2 Out of 10
Percentage of Missing Values = 20%
(Factor Score Divided by Maximum Score and Multiplied by 100)

WASTE CHARACTERISTICS

Site No. 28

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points

30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating: observed contamination of storage pond

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	0	7	0	21
Total Waste Quantity	Assumed	0	4	0	12
Waste Incompatibility	Assumed	0	3	0	9
Absence of Liners or Confining Beds		1	6	6	18
Use of Leachate Collection System	N/A	—	6	—	
Use of Gas Collection Systems	N/A	—	2	—	
Site Closure	N/A	—	8	—	
Subsurface Flows		0	7	0	21

Number of Assumed Values = 3 Out of 9 — SUBTOTALS 27 102

Percentage of Assumed Values = 33% — SUBSCORE 26

Number of Missing and Non-Applicable Values = 3 Out of 9 — (Factor Score Divided by Maximum Score and Multiplied by 100)

Percentage of Missing and Non-Applicalbe Values = 33%

Overall Number of Assumed Values = 7 Out of 25

Overall Percentage of Assumed Values = 28%

OVERALL SCORE 43

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: Site No. 29 - Diesel Fuel Spill
Location: Northwest of Site - POW-1
Owner/Operator: POW-1
Comments: 25,000 gallon diesel fuel spill - 1978

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	0	15	0	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	0	3	0	9
Critical Environments	1	12	12	36
Water Quality of Nearby Surface Water Body Assumed	1	6	6	18
		SUBTOTALS	40	138
		SUBSCORE		29

Number of Assumed Values = 1 Out of 6
Percentage of Assumed Values = 17 %
Number of Missing Values = 0 Out of 6
Percentage of Missing Values = 0 %
(Factor Score Divided by Maximum Score and Multiplied by 100)

PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination Assumed	1	15	15	45
Type of Contamination, Soil/Biota Assumed	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	12	18
Soil Permeability Assumed	1	6	6	18
Bedrock Permeability N/A	-	4	-	-
Depth to Bedrock N/A	-	4	-	-
Surface Erosion	1	4	4	4
		SUBTOTALS	115	171
		SUBSCORE		44

Number of Assumed Values = 3 Out of 10
Percentage of Assumed Values = 30 %
Number of Missing Values = 2 Out of 10
Percentage of Missing Values = 20 %
(Factor Score Divided by Maximum Score and Multiplied by 100)

WASTE CHARACTERISTICS

Site No. 29

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

Reason for Assigned Hazardous Rating: 25,000 gallon fuel spill

SUBSCORE 50

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site	N/A	—	7	—	—
Hazardous Waste Quantity	Assumed	1	7	7	21
Total Waste Quantity	N/A	—	4	—	—
Waste Incompatibility		0	3	0	9
Absence of Liners or Confining Beds		1	6	6	18
Use of Leachate Collection System	N/A	—	6	—	—
Use of Gas Collection Systems	N/A	—	2	—	—
Site Closure	N/A	—	8	—	—
Subsurface Flows		0	7	0	21
			SUBTOTALS	13	69
			SUBSCORE		19

Number of Assumed Values = 1 Out of 9
Percentage of Assumed Values = 11%
Number of Missing and Non-Applicable Values = 5 Out of 9
Percentage of Missing and Non-Applicalbe Values = 55%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 5 Out of 25
Overall Percentage of Assumed Values = 20%

OVERALL SCORE 36

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: Site No. 31 Old Dump Site
Location: West End of Saltwater Lagoon - POW-1
Owner/Operator: POW-1
Comments: Site Was used prior to 1972

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	0	15	0	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	0	3	0	9
Critical Environments	1	12	12	36
Water Quality of Nearby Surface Water Body Assumed	1	6	6	18
		SUBTOTALS	40	138
		SUBSCORE		29

Number of Assumed Values = 1 Out of 6
Percentage of Assumed Values = 17%
Number of Missing Values = 0 Out of 6
Percentage of Missing Values = 0%

(Factor Score Divided by Maximum Score and Multiplied by 100)

PATHWAYS				
Evidence of Water Contamination	1	10	10	30
Level of Water Contamination Assumed	1	15	15	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability Assumed	1	6	6	18
Bedrock Permeability N/A	—	4	—	—
Depth to Bedrock N/A	—	4	—	—
Surface Erosion	1	4	4	12
		SUBTOTALS	79	171
		SUBSCORE		46

Number of Assumed Values = 2 Out of 10
Percentage of Assumed Values = 20%
Number of Missing Values = 2 Out of 10
Percentage of Missing Values = 20%

(Factor Score Divided by Maximum Score and Multiplied by 100)

WASTE CHARACTERISTICS

Site No. 31

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating:
Dump received all waste generated at site

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	1	7	7	21
Total Waste Quantity	Assumed	0	4	0	12
Waste Incompatibility	Assumed	1	3	3	9
Absence of Liners or Confining Beds		1	6	6	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		3	8	24	24
Subsurface Flows		0	7	0	21
			SUBTOTALS	85	150
			SUBSCORE		57

Number of Assumed Values = 3 Out of 9
Percentage of Assumed Values = 33%
Number of Missing and Non-Applicable Values = 0 Out of 9
Percentage of Missing and Non-Applicalbe Values = 0%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 6 Out of 25
Overall Percentage of Assumed Values = 24%

OVERALL SCORE 46

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: Site No. 32 - Husky Dump Site
Location: ~1 Mile Southwest of Site - Pow-1
Owner/Operator: Husky Oil Company
Comments: Husky Oil Company handles waste disposal for site

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	0	15	0	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	0	3	0	9
Critical Environments	1	12	12	36
Water Quality of Nearby Surface Water Body Assumed	1	6	6	18
		SUBTOTALS	40	138
		SUBSCORE		29

Number of Assumed Values = 1 Out of 6
Percentage of Assumed Values = 17%
Number of Missing Values = 0 Out of 6
Percentage of Missing Values = 0%

(Factor Score Divided by Maximum Score and Multiplied by 100)

PATHWAYS				
Evidence of Water Contamination	1	10	10	30
Level of Water Contamination Assumed	1	15	15	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability Assumed	1	6	6	18
Bedrock Permeability N/A	—	4	—	—
Depth to Bedrock N/A	—	4	—	—
Surface Erosion	1	4	4	12
		SUBTOTALS	79	171
		SUBSCORE		46

Number of Assumed Values = 2 Out of 10
Percentage of Assumed Values = 20%
Number of Missing Values = 2 Out of 10
Percentage of Missing Values = 20%

(Factor Score Divided by Maximum Score and Multiplied by 100)

WASTE CHARACTERISTICS

Site No. 32

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points

30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating:

Currently receives site generated waste and waste generated by Husky Oil and Geophysical Survey Inc

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	1	7	7	21
Total Waste Quantity	Assumed	0	4	0	12
Waste Incompatibility	Assumed	1	3	3	9
Absence of Liners or Confining Beds		1	6	6	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		3	8	24	24
Subsurface Flows		0	7	0	21
			SUBTOTALS	76	150
			SUBSCORE		51

Number of Assumed Values = 3 Out of 9
Percentage of Assumed Values = 33%
Number of Missing and Non-Applicable Values = 0 Out of 9
Percentage of Missing and Non-Applicaibe Values = 0%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 6 Out of 25
Overall Percentage of Assumed Values = 24%

OVERALL SCORE 44

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: Site No. 33 Diesel Fuel Storage
Location: North of Site POW-M
Owner/Operator: POW-M
Comments: Tanks are undiked, also this was site of fuel spill

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	0	15	0	45
Distance to Reservation Boundary	2	6	12	18
Land Use/Zoning	0	3	0	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body Assumed	1	6	6	18
		SUBTOTALS	22	138
		SUBSCORE		16

Number of Assumed Values = 1 Out of 6
Percentage of Assumed Values = 17 %
Number of Missing Values = 0 Out of 6
Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	0	5	0	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability Assumed	1	6	6	18
Bedrock Permeability N/A	—	4	—	—
Depth to Bedrock N/A	—	4	—	—
Surface Erosion	1	4	4	12
		SUBTOTALS	49	171
		SUBSCORE		29

Number of Assumed Values = 1 Out of 10
Percentage of Assumed Values = 10 %
Number of Missing Values = 2 Out of 10
Percentage of Missing Values = 20 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

WASTE CHARACTERISTICS

Site No. 33

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating: Fuel Spill

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	0	7	0	21
Total Waste Quantity	Assumed	0	4	0	12
Waste Incompatibility	Assumed	0	3	0	9
Absence of Liners or Confining Beds		1	6	6	18
Use of Leachate Collection System	N/A	—	6	—	—
Use of Gas Collection Systems	N/A	—	2	—	—
Site Closure	N/A	—	8	—	—
Subsurface Flows		0	7	0	21
			SUBTOTALS	27	102
			SUBSCORE		26

Number of Assumed Values = 3 Out of 9
Percentage of Assumed Values = 33%
Number of Missing and Non-Applicable Values = 3 Out of 9
Percentage of Missing and Non-Applicalbe Values = 33%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 5 Out of 25
Overall Percentage of Assumed Values = 20%

OVERALL SCORE 30

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: Site No. 37 - Fuel Spill
Location: Power House - LIZ-3
Owner/Operator: LIZ-3
Comments: 10,000 gallon diesel fuel spill occurred in 1976 4000 gallons were recovered

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	0	15	0	45
Distance to Reservation Boundary	2	6	12	18
Land Use/Zoning	0	3	0	9
Critical Environments	1	12	12	36
Water Quality of Nearby Surface Water Body Assumed	1	6	6	18
		SUBTOTALS	34	138
		SUBSCORE		25

Number of Assumed Values = 1 Out of 6
Percentage of Assumed Values = 17 %
Number of Missing Values = 0 Out of 6
Percentage of Missing Values = 0 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination Assumed	1	15	15	45
Type of Contamination, Soil/Biota Assumed	1	5	5	15
Distance to Nearest Surface Water	2	4	8	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability Assumed	1	6	6	18
Bedrock Permeability N/A	—	4	—	—
Depth to Bedrock N/A	—	4	—	—
Surface Erosion	1	4	4	12
		SUBTOTALS	65	171
		SUBSCORE		38

Number of Assumed Values = 3 Out of 10
Percentage of Assumed Values = 30 %
Number of Missing Values = 2 Out of 10
Percentage of Missing Values = 20 %

(Factor Score Divided by Maximum Score and Multiplied by 100)

WASTE CHARACTERISTICS

Site No. 37

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating: Fuel Spill

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site	N/A	-	7	-	-
Hazardous Waste Quantity	Assumed	0	7	0	21
Total Waste Quantity	Assumed	0	4	0	12
Waste Incompatibility	Assumed	0	3	0	9
Absence of Liners or Confining Beds		1	6	6	18
Use of Leachate Collection System	N/A	-	6	-	-
Use of Gas Collection Systems	N/A	-	2	-	-
Site Closure	N/A	-	8	-	-
Subsurface Flows		1	7	7	21
			SUBTOTALS	13	81
			SUBSCORE		16

Number of Assumed Values = 3 Out of 9
Percentage of Assumed Values = 33%
Number of Missing and Non-Applicable Values = 4 Out of 9
Percentage of Missing and Non-Applicalbe Values = 44%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 8 Out of 25
Overall Percentage of Assumed Values = 32%

OVERALL SCORE 33

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: Site No. 38 - Current Dump Site
Location: South of Site - LIZ-3
Owner/Operator: LIZ-3
Comments: Site is in excellent condition, well maintained

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	0	15	0	45
Distance to Reservation Boundary	2	6	12	18
Land Use/Zoning	0	3	0	9
Critical Environments	1	12	12	36
Water Quality of Nearby Surface Water Body Assumed	1	6	6	18
		SUBTOTALS	30	138
		SUBSCORE		22

Number of Assumed Values = 1 Out of 6
Percentage of Assumed Values = 17%
Number of Missing Values = 0 Out of 6
Percentage of Missing Values = 0%

(Factor Score Divided by Maximum Score and Multiplied by 100)

PATHWAYS					
Evidence of Water Contamination		0	10	0	30
Level of Water Contamination	Assumed	0	15	0	45
Type of Contamination, Soil/Biota	Assumed	0	5	0	15
Distance to Nearest Surface Water		2	4	8	12
Depth to Groundwater		3	7	21	21
Net Precipitation		1	6	6	18
Soil Permeability	Assumed	1	6	6	18
Bedrock Permeability	N/A	—	4	—	—
Depth to Bedrock	N/A	—	4	—	—
Surface Erosion		1	4	4	12
			SUBTOTALS	45	171
			SUBSCORE		26

Number of Assumed Values = 3 Out of 10
Percentage of Assumed Values = 30%
Number of Missing Values = 2 Out of 10
Percentage of Missing Values = 20%

(Factor Score Divided by Maximum Score and Multiplied by 100)

WASTE CHARACTERISTICS

Site No. 38

Hazardous Rating: Judgmental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating:
Some dumping of hazardous materials could occur

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	0	7	0	21
Total Waste Quantity	Assumed	0	4	0	12
Waste Incompatibility	Assumed	0	3	0	9
Absence of Liners or Confining Beds		1	6	6	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure	N/A	—	8	—	—
Subsurface Flows		0	7	0	21
			SUBTOTALS	51	150
			SUBSCORE		34

Number of Assumed Values = 3 Out of 9
Percentage of Assumed Values = 33%
Number of Missing and Non-Applicable Values = 1 Out of 9
Percentage of Missing and Non-Applicalbe Values = 11%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 7 Out of 25
Overall Percentage of Assumed Values = 28%

OVERALL SCORE 33

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: Site No. 39 - Old Dump Site - SOUTH
Location: ~ 2 miles South of site - LIZ-3
Owner/Operator: LIZ-3
Comments: This site was cleared-up in 1979-80

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	0	15	0	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	0	3	0	9
Critical Environments	1	12	12	36
Water Quality of Nearby Surface Water Body Assumed	1	6	6	18
		SUBTOTALS	36	138
		SUBSCORE		26

Number of Assumed Values = 1 Out of 6
Percentage of Assumed Values = 17%
Number of Missing Values = 0 Out of 6
Percentage of Missing Values = 0%
(Factor Score Divided by Maximum Score and Multiplied by 100)

PATHWAYS					
Evidence of Water Contamination		1	10	0	30
Level of Water Contamination	Assumed	1	15	0	45
Type of Contamination, Soil/Biota	Assumed	1	5	0	15
Distance to Nearest Surface Water		3	4	12	12
Depth to Groundwater		3	7	21	21
Net Precipitation		1	6	6	18
Soil Permeability	Assumed	1	6	6	18
Bedrock Permeability	N/A	–	4	–	–
Depth to Bedrock	N/A	–	4	–	–
Surface Erosion		1	4	4	12
			SUBTOTALS	49	171
			SUBSCORE		29

Number of Assumed Values = 3 Out of 10
Percentage of Assumed Values = 30%
Number of Missing Values = 2 Out of 10
Percentage of Missing Values = 20%
(Factor Score Divided by Maximum Score and Multiplied by 100)

WASTE CHARACTERISTICS

Site No. 39

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points

30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating:
Old dump site received all waste generated by site

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	0	7	0	21
Total Waste Quantity	Assumed	0	4	0	12
Waste Incompatibility	Assumed	1	3	3	9
Absence of Liners or Confining Beds		1	6	6	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		0	8	0	24
Subsurface Flows		1	7	7	21
			SUBTOTALS	61	150
			SUBSCORE		41

Number of Assumed Values = 3 Out of 9
Percentage of Assumed Values = 33%
Number of Missing and Non-Applicable Values = 0 Out of 9
Percentage of Missing and Non-Applicaibe Values = 0%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 7 Out of 25
Overall Percentage of Assumed Values = 28%

OVERALL SCORE 36

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: Site No. 40 - Current Dump Site
Location: Behind Hangar - LIZ-2
Owner/Operator: LIZ-2
Comments: Waste which cannot be incinerated is dumped here, also village of Point Lay and Alaska International Construction Dump Here

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	0	15	0	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	0	3	0	9
Critical Environments	1	12	12	36
Water Quality of Nearby Surface Water Body Assumed	1	6	6	18
		SUBTOTALS	36	138
		SUBSCORE		26

Number of Assumed Values = 1 Out of 6
Percentage of Assumed Values = 17%
Number of Missing Values = 0 Out of 6
Percentage of Missing Values = 0%

(Factor Score Divided by Maximum Score and Multiplied by 100)

PATHWAYS					
Evidence of Water Contamination		2	10	20	30
Level of Water Contamination	Assumed	1	15	15	45
Type of Contamination, Soil/Biota	Assumed	1	5	5	15
Distance to Nearest Surface Water		3	4	12	12
Depth to Groundwater		3	7	21	21
Net Precipitation		1	6	6	18
Soil Permeability	Assumed	1	6	6	18
Bedrock Permeability	N/A	—	4	—	—
Depth to Bedrock	N/A	—	4	—	—
Surface Erosion		1	4	4	12
			SUBTOTALS	89	171
			SUBSCORE		52

Number of Assumed Values = 3 Out of 10
Percentage of Assumed Values = 30%
Number of Missing Values = 2 Out of 10
Percentage of Missing Values = 20%

(Factor Score Divided by Maximum Score and Multiplied by 100)

WASTE CHARACTERISTICS — Site No. 40

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE: 50

Reason for Assigned Hazardous Rating: Uncontrolled dumping by others

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity		0	7	0	21
Total Waste Quantity		0	4	0	12
Waste Incompatibility	Assumed	0	3	0	9
Absence of Liners or Confining Beds		3	6	18	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure	N/A	—	8	—	—
Subsurface Flows		1	7	7	21
			SUBTOTALS	70	126
			SUBSCORE		56

Number of Assumed Values = 1 Out of 9
Percentage of Assumed Values = 11%
Number of Missing and Non-Applicable Values = 1 Out of 9
Percentage of Missing and Non-Applicalbe Values = 11%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 5 Out of 25
Overall Percentage of Assumed Values = 20%

OVERALL SCORE: 48

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: Site No. 43 Old Dump Site
Location: North of Site - LIZ-2
Owner/Operator: LIZ-2
Comments: Old site, Cleaned up In 1979-80

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS					
Population Within 1,000 Feet		2	4	8	12
Distance to Nearest Drinking Water Well		0	15	0	45
Distance to Reservation Boundary		3	6	18	18
Land Use/Zoning		0	3	0	9
Critical Environments		1	12	12	36
Water Quality of Nearby Surface Water Body	Assumed	1	6	6	18
			SUBTOTALS	44	138
			SUBSCORE		32

Number of Assumed Values = 1 Out of 6
Percentage of Assumed Values = 17%
Number of Missing Values = 0 Out of 6
Percentage of Missing Values = 0%

(Factor Score Divided by Maximum Score and Multiplied by 100)

PATHWAYS					
Evidence of Water Contamination		0	10	0	30
Level of Water Contamination	Assumed	1	15	15	45
Type of Contamination, Soil/Biota	Assumed	1	5	5	15
Distance to Nearest Surface Water		3	4	12	12
Depth to Groundwater		3	7	21	21
Net Precipitation		1	6	6	18
Soil Permeability	Assumed	1	6	6	18
Bedrock Permeability	N/A	—	4	—	—
Depth to Bedrock	N/A	—	4	—	—
Surface Erosion		1	4	4	12
			SUBTOTALS	69	171
			SUBSCORE		40

Number of Assumed Values = 3 Out of 10
Percentage of Assumed Values = 30%
Number of Missing Values = 2 Out of 10
Percentage of Missing Values = 20%

(Factor Score Divided by Maximum Score and Multiplied by 100)

WASTE CHARACTERISTICS

Site No. 43

Hazardous Rating: Judgmental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating:
Site Received All waste prior to 1973

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	0	7	0	21
Total Waste Quantity	Assumed	1	4	4	12
Waste Incompatibility	Assumed	0	3	0	9
Absence of Liners or Confining Beds		1	6	6	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		3	8	24	24
Subsurface Flows		1	7	7	21
			SUBTOTALS	86	150
			SUBSCORE		57

Number of Assumed Values = 3 Out of 9
Percentage of Assumed Values = 33%
Number of Missing and Non-Applicable Values = 0 Out of 9
Percentage of Missing and Non-Applicalbe Values = 0%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 7 Out of 25
Overall Percentage of Assumed Values = 28%

OVERALL SCORE 45

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: Site No. 44 Suspected Dump Site
Location: North of Site LIZ-2
Owner/Operator: Village of Ft. Lay
Comments: Identified from Interviews

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	2	4	8	12
Distance to Nearest Drinking Water Well	0	15	0	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	0	3	0	9
Critical Environments	1	12	12	36
Water Quality of Nearby Surface Water Body Assumed	1	6	6	18
		SUBTOTALS	44	138
		SUBSCORE		32

Number of Assumed Values = 1 Out of 6
Percentage of Assumed Values = 17%
Number of Missing Values = 0 Out of 6
Percentage of Missing Values = 0%

(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination Assumed	1	15	15	45
Type of Contamination, Soil/Biota Assumed	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	3	7	21	21
Net Precipitation	1	6	6	18
Soil Permeability Assumed	1	6	6	18
Bedrock Permeability N/A	—	4	—	—
Depth to Bedrock N/A	—	4	—	—
Surface Erosion	1	4	4	12
		SUBTOTALS	69	171
		SUBSCORE		40

Number of Assumed Values = 3 Out of 10
Percentage of Assumed Values = 30%
Number of Missing Values = 2 Out of 10
Percentage of Missing Values = 20%

(Factor Score Divided by Maximum Score and Multiplied by 100)

WASTE CHARACTERISTICS

Site No. 44

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating:
If confirmed, site probably received uncontrolled waste

WASTE MANAGEMENT PRACTICES

RATING FACTOR		FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		3	7	21	21
Hazardous Waste Quantity	Assumed	0	7	0	21
Total Waste Quantity	Assumed	1	4	4	12
Waste Incompatibility	Assumed	0	3	0	9
Absence of Liners or Confining Beds		1	6	6	18
Use of Leachate Collection System		3	6	18	18
Use of Gas Collection Systems		3	2	6	6
Site Closure		3	8	24	24
Subsurface Flows		1	7	7	21
			SUBTOTALS	86	130
			SUBSCORE		57

Number of Assumed Values = 3 Out of 9
Percentage of Assumed Values = 33%
Number of Missing and Non-Applicable Values = 0 Out of 9
Percentage of Missing and Non-Applicalbe Values = 0%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 7 Out of 25
Overall Percentage of Assumed Values = 28%

OVERALL SCORE 45

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

INSTALLATION RESTORATION PROGRAM RECORDS SEARCH

HAZARD ASSESSMENT RATING METHODOLOGY FOR ALASKA DEW LINE STATIONS

Prepared for

Air Force Engineering and Services Center
Directorate of Environmental Planning
Tyndall Air Force Base, Florida 32403

Prepared by

CH2M HILL
P.O. Box 1647
Gainesville, Florida 32602

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Appendix G
NEW HAZARDOUS ASSESSMENT RATING METHODOLOGY

USAF INSTALLATION RESTORATION PROGRAM
HAZARD ASSESSMENT RATING METHODOLOGY

BACKGROUND

The Department of Defense (DOD) has established a comprehensive program to identify, evaluate, and control problems associated with past disposal practices at DOD facilities. One of the actions required under this program is to:

> "develop and maintain a priority listing of contaminated installations and facilities for remedial action based on potential hazard to public health, welfare, and environmental impacts." (Reference: DEQPPM 81-5, 11 December 1981).

Accordingly, the United States Air Force (USAF) has sought to establish a system to set priorities for taking further actions at sites based upon information gathered during the Records Search phase of its Installation Restoration Program (IRP).

The first site rating model was developed in June 1981 at a meeting with representatives from USAF Occupational Environmental Health Laboratory (OEHL), Air Force Engineering Services Center (AFESC), Engineering-Science (ES) and CH_2M Hill. The basis for this model was a system developed for EPA by JRB Associates of McLean, Virginia. The JRB model was modified to meet Air Force needs.

After using this model for 6 months at over 20 Air Force installations, certain inadequacies became apparent. Therefore, on January 26 and 27, 1982, representatives of USAF OEHL, AFESC, various major commands, Engineering Science, and CH_2M Hill met to address the inadequacies. The result of the meeting was a new site rating model designed to present a better picture of the hazards posed by sites at Air Force installations. The new rating model described in this presentation is referred to as the Hazard Assessment Rating Methodology.

PURPOSE

The purpose of the site rating model is to provide a relative ranking of sites of suspected contamination from hazardous substances. This model will assist the Air Force in setting priorities for follow-on site investigations and confirmation work under Phase II of IRP.

This rating system is used only after it has been determined that (1) potential for contamination exists (hazardous wastes present in sufficient quantity), and (2) potential for migration exists. A site can be deleted from consideration for rating on either basis.

DESCRIPTION OF MODEL

Like the other hazardous waste site ranking models, the U.S. Air Force's site rating model uses a scoring system to rank sites for priority attention. However, in developing this model, the designers incorporated some special features to meet specific DOD program needs.

The model uses data readily obtained during the Record Search portion (Phase I) of the IRP. Scoring judgments and computations are easily made. In assessing the hazards at a given site, the model develops a score based on the most likely routes of contamination and the worst hazards at the site. Sites are given low scores only if there are clearly no hazards at the site. This approach meshes well with the policy for evaluating and setting restrictions on excess DOD properties.

Site scores are developed using the appropriate ranking factors according to the method presented in the flow chart (Figure 1). The site rating form is provided in Figure 2 and the rating factor guidelines are provided in Table 1.

As with the previous model, this model considers four aspects of the hazard posed by a specific site: the possible receptors of the contamination the waste and its characteristics, potential pathways for waste contaminant migration, and any efforts to contain the contaminants. Each of these categories contains a number of rating factors that are used in the overall hazard rating.

The receptors category rating is calculated by scoring each factor, multiplying by a factor weighting constant and adding the weighted scores to obtain a total category score.

The pathways category rating is based on evidence of contaminant migration or an evaluation of the highest potential (worst case) for contaminant migration along one of three pathways. If evidence of contaminant migration exists, the category is given a subscore of 80 to 100 points. For indirect evidence, 80 points are assigned and for direct evidence 100 points are assigned. If no evidence is found, the highest score among three possible routes is used. These routes are surface water migration, flooding, and ground-water migration. Evaluation of each route involves factors associated with the particular migration route. The three pathways are evaluated and the highest score among all four of the potential scores is used.

The waste characteristics category is scored in three steps. First, a point rating is assigned based on an assessment of the waste quantity and the hazard (worst case) associated with the site. The level of confidence in the information is also factored into the assessment. Next, the score is multiplied by a waste persistence factor, which acts to reduce the score if the waste is not very persistent. Finally, the score is further modified by the physical state of the waste. Liquid wastes receive the maximum score, while scores for sludges and solids are reduced.

The scores for each of the three categories are then added together and normalized to a maximum possible score of 100. Then the waste management practice category is scored. Sites at which there is no containment are not reduced in score. Scores for sites with limited containment can be reduced by 5 percent. If a site is contained and well managed, its score can be reduced by 90 percent. The final site score is calculated by applying the waste managment practices category factor to the sum of the scores for the other three categories.

SITE RATING
METHODOLOGY FLOW CHART

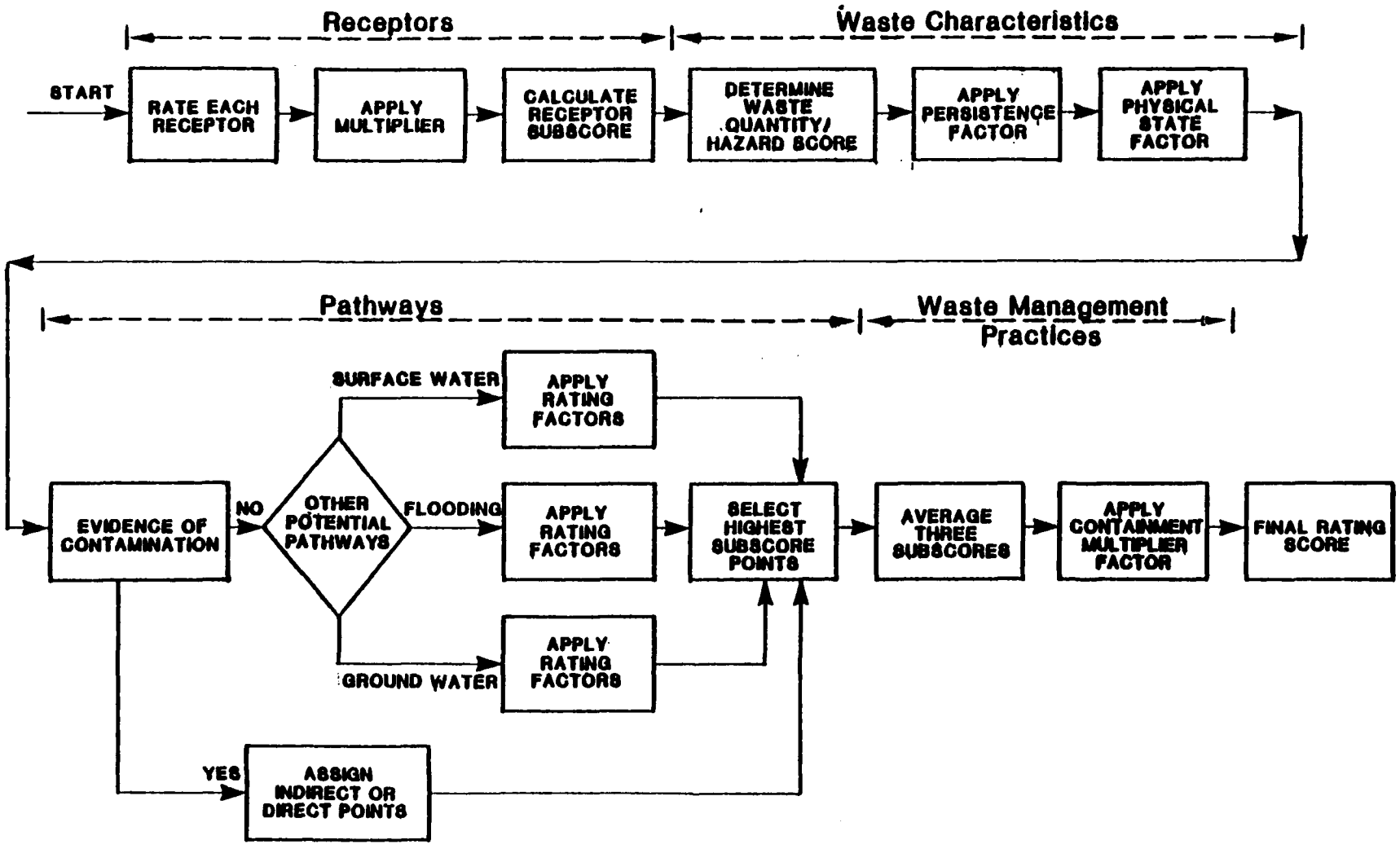

FIGURE 2

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE _____

LOCATION _____

DATE OF OPERATION OR OCCURRENCE _____

OWNER/OPERATOR _____

COMMENTS/DESCRIPTION _____

SITE RATED BY _____

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site		4		
B. Distance to nearest well		10		
C. Land use/zoning within 1 mile radius		3		
D. Distance to reservation boundary		6		
E. Critical environments within 1 mile radius of site		10		
F. Water quality of nearest surface water body		6		
G. Ground water use of uppermost aquifer		9		
H. Population served by surface water supply within 3 miles downstream of site		6		
I. Population served by ground-water supply within 3 miles of site		6		
		Subtotals	_____	_____

Receptors subscore (100 X factor score subtotal/maximum score subtotal) _____

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level the information.

1. Waste quantity (S = small, M = medium, L = large) _____
2. Confidence level (C = confirmed, S = suspected) _____
3. Hazard rating (H = high, M = medium, L = low) _____

Factor Subscore A (from 20 to 100 based on factor score matrix) _____

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

_____ X _____ = _____

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

_____ X _____ = _____

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore _____

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water		8		
Net precipitation		6		
Surface erosion		8		
Surface permeability		6		
Rainfall intensity		8		
		Subtotals	_____	_____

Subscore (100 X factor score subtotal/maximum score subtotal) _____

2. Flooding

Flooding		1		

Subscore (100 x factor score/3) _____

3. Ground-water migration

Depth to ground water		8		
Net precipitation		6		
Soil permeability		8		
Subsurface flows		8		
Direct access to ground water		8		
		Subtotals	_____	_____

Subscore (100 x factor score subtotal/maximum score subtotal) _____

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore _____

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors _____
Waste Characteristics _____
Pathways _____

Total _____ divided by 3 = _____
Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

_____ X _____ = [ ]

TABLE 1

HAZARDOUS ASSESSMENT RATING METHODOLOGY GUIDELINES

I. RECEPTORS CATEGORY

Rating Factors	Rating Scale Levels 0	1	2	3	Multiplier
A. Population within 1,000 feet (includes on-base facilities)	0	1 - 25	26 - 100	Greater than 100	4
B. Distance to nearest water well	Greater than 3 miles	1 to 3 miles	3,001 feet to 1 mile	0 to 3,000 feet	10
C. Distance to installation boundary	Greater than 2 miles	1 to 2 miles	1,001 feet to 1 mile	0 to 1,000 feet	3
D. Land Use/Zoning (within 1 mile radius)	Completely remote (zoning not applicable)	Agricultural	Commercial or industrial	Residential	6
E. Critical environments (within 1 mile radius)	Not a critical environment	Natural areas	Pristine natural areas; minor wetlands; preserved areas; presence of economically important natural resources susceptible to contamination.	Major habitat of an endangered or threatened species; presence of recharge area; major wetlands.	10
F. Water quality/use designation of nearest surface water body	Agricultural or industrial use.	Recreation, propagation and management of fish and wildlife.	Shellfish propagation and harvesting.	Potable water supplies	6
G. Ground-Water use of uppermost aquifer	Not used, other sources readily available.	Commercial, industrial, or irrigation, very limited other water sources.	Drinking water, municipal water available.	Drinking water, no municipal water available; commercial, industrial, or irrigation, no other water source available.	9
H. Population served by surface water supplies within 3 miles downstream of site	0	1 - 50	51 - 1,000	Greater than 1,000	6
I. Population served by aquifer supplies within 3 miles of site	0	1 - 50	51 - 1,000	Greater than 1, 000	6

TABLE 1 (Continued)

HAZARDOUS ASSESSMENT RATING METHODOLOGY GUIDELINES (Cont'd)

II. WASTE CHARACTERISTICS

A-1 Hazardous Waste Quantity

S = Small quantity (5 tons or 20 drums of liquid)
M = Moderate quantity (5 to 20 tons or 21 to 85 drums of liquid)
L = Large quantity (20 tons or 85 drums of liquid)

A-2 Confidence Level of Information

C = Confirmed confidence level (minimum criteria below)

- o Verbal reports from interviewer (at least 2) or written information from the records.
- o Knowledge of types and quantities of wastes generated by shops and other areas on base.
- o Based on the above, a determination of the types and quantities of waste disposed of at the site.

S = Suspected confidence level

- o No verbal reports or conflicting verbal reports and no written information from the records.
- o Logic based on a knowledge of the types and quantities of hazardous wastes generated at the base, and a history of past waste disposal practices indicate that these wastes were disposed of at a site.

A-3 Hazard Rating

Hazard Category	Rating Scale Levels			
	0	1	2	3
Toxicity	Sax's Level 0	Sax's Level 1	Sax's Level 2	Sax's Level 3
Ignitability	Flash point greater than 200°F	Flash point at 140°F to 200°F	Flash point at 80°F to 140°F	Flash point less than 80°F
Radioactivity	At or below background levels	1 to 3 times background levels	3 to 5 times background levels	Over 5 times background levels

Use the highest individual rating based on toxicity, ignitability and radioactivity and determine the hazard rating.

Hazard Rating	Points
High (H)	3
Medium (M)	2
Low (L)	1

TABLE 1 (Continued)

HAZARDOUS ASSESSMENT RATING METHODOLOGY GUIDELINES (Cont'd)

II. WASTE CHARACTERISTICS (Continued)

Waste Characteristics Matrix

Point Rating	Hazardous Waste Quantity	Confidence Level of Information	Hazard Rating
100	L	C	H
80	L	C	M
	M	C	H
70	L	S	H
60	S	C	H
	M	C	M
50	L	S	M
	L	C	L
	M	S	H
	S	C	M
40	S	S	H
	M	S	M
	M	C	L
	L	S	L
30	S	C	L
	M	S	L
	S	S	M
20	S	S	L

Notes:
For a site with more than one hazardous waste, the waste quantities may be added using the following rules:
Confidence Level
- o Confirmed confidence levels (C) can be added
- o Suspected confidence levels (S) can be added
- o Confirmed confidence levels cannot be added with suspected confidence levels

Waste Hazard Rating
- o Wastes with the same hazard rating can be added
- o Wastes with different hazard ratings can only be added in a downgrade mode, e.g., MCM + SCH = LCM if the total quantity is greater than 20 tons.

Example: Several wastes may be present at a site, each having an MCM designation (60 points). By adding the quantities of each waste, the designation may change to LCM (80 points). In this case, the correct point rating for the waste is 80.

B. Persistence Multiplier for Point Rating

Persistence Criteria	Multiply Point Rating From Part A by the Following
Metals, polycyclic compounds, and halogenated hydrocarbons	1.0
Substituted and other ring compounds	0.9
Straight chain hydrocarbons	0.8
Easily biodegradable compounds	0.4

C. Physical State Multiplier

Physical State	Multiply Point Total From Parts A and B by the Following
Liquid	1.0
Sludge	0.75
Solid	0.50

TABLE 1 (Continued)

HAZARDOUS ASSESSMENT RATING METHODOLOGY GUIDELINES (Cont'd)

III. PATHWAYS CATEGORY

A. Evidence of Contamination

Direct evidence is obtained from laboratory analyses of hazardous contaminants present above natural background levels in surface water, ground water, or air. Evidence should confirm that the source of contamination is the site being evaluated.

Indirect evidence might be from visual observation (i.e., leachate), vegetation stress, sludge deposits, presence of taste and odors in drinking water, or reported discharges that cannot be directly confirmed as resulting from the site, but the site is greatly suspected of being a source of contamination.

B-1 POTENTIAL FOR SURFACE WATER CONTAMINATION

Rating Factor	Rating Scale Levels 0	1	2	3	Multiplier
Distance to nearest surface water (includes drainage ditches and storm sewers)	Greater than 1 mile	2,001 feet to 1 mile	501 feet to 2,000 feet	0 to 500 feet	8
Net precipitation	Less than -10 in.	-10 to + 5 in.	+5 to +20 in.	Greater than +20 in.	6
Surface erosion	None	Slight	Moderate	Severe	8
Surface permeability	0% to 10^{-2} 15% clay ($>10^{-2}$ cm/sec)	15% to 30% clay (10^{-2} to 10^{-4} cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	Greater than 50% clay ($<10^{-6}$ cm/sec)	6
Rainfall intensity based on 1 year 24-hr rainfall	<1.0 inch	1.0-2.0 inches	2.1-3.0 inches	>3.0 inches	8
B-2 POTENTIAL FOR FLOODING					
Floodplain	Beyond 100-year floodplain	In 25-year floodplain	In 10-year floodplain	Floods annually	1
B-3 POTENTIAL FOR GROUND-WATER CONTAMINATION					
Depth to ground water	Greater than 500 ft	50 to 500 feet	11 to 50 feet	0 to 10 feet	8
Net precipitation	Less than -10 in.	-10 to +5 in.	+5 to +20 in.	Greater than +20 in.	6
Soil permeability	Greater than 50% clay ($>10^{-6}$ cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	15% to 30% clay (10^{-2} to 10^{-4} cm/sec)	0% to 10^{-2} 15% clay ($<10^{-2}$ cm/sec)	8
Subsurface flows	Bottom of site greater than 5 feet above high ground-water level	Bottom of site occasionally submerged	Bottom of site frequently submerged	Bottom of site located below mean ground-water level	8
Direct access to ground water (through faults, fractures, faulty well casings, subsidence fissures,	No evidence of risk	Low risk	Moderate risk	High risk	8

TABLE 1 (Continued)

HAZARDOUS ASSESSMENT RATING METHODOLOGY GUIDELINES (Cont'd)

IV. WASTE MANAGEMENT PRACTICES CATEGORY

A. This category adjusts the total risk as determined from the receptors, pathways, and waste characteristics categories for waste management practices and engineering controls designed to reduce this risk. The total risk is determined by first averaging the receptors, pathways, and waste characteristics subscores.

B. WASTE MANAGEMENT PRACTICES FACTOR

The following multipliers are then applied to the total risk points (from A):

Waste Management Practice	Multiplier
No containment	1.0
Limited containment	0.95
Fully contained and in full compliance	0.10

Guidelines for fully contained:

Landfills:

- o Clay cap or other impermeable cover
- o Leachate collection system
- o Liners in good condition
- o Adequate monitoring wells

Surface Impoundments:

- o Liners in good condition
- o Sound dikes and adequate freeboard
- o Adequate monitoring wells

Spills:

- o Quick spill cleanup action taken
- o Contaminated soil removed
- o Soil and/or water samples confirm total cleanup of the spill

Fire Proection Training Areas:

- o Concrete surface and berms
- o Oil/water separator for pretreatment of runoff
- o Effluent from oil/water separator to treatment plant

General Note: If data are not available or known to be complete the factor ratings under items I-A through I, III-B-1 or III-B-3, then leave blank for calculation of factor score and maximum possible score.

Appendix H
NEW SITE RATING FORMS

Table 1
SUMMARY OF RESULTS OF SITE ASSESSMENTS

Site No.	Site Description	Subscores (% of Maximum Possible Score in Each Category)			Overall Score (Sum of Subscores/3)
		Receptors	Pathways	Waste Characteristics	
BAR-M					
1	Old Dump Site	28	56	80	52
3	Waste POL Pond	28	80	80	63
4	Current Dump Site	28	56	50	45
8	Contaminated Drainage Cut	28	80	80	63
9	Old Pump Site--N.W.	28	60	50	44
POW-3					
13	Old Dump Site--East	19	48	50	39
POW-2					
16	Old Dump Site--N.W.	24	48	50	39
POW-1					
28	POL Storage Area	24	80	48	51
29	Diesel Fuel Spill	24	48	80	51
31	Old Dump Lagoon Site	24	48	50	41
32	Husky Dump Site	24	48	50	41
LIZ-3					
37	Diesel Fuel Spills	21	42	80	48
38	Current Dump Site	19	48	50	39
39	Old Dump Site--South	22	48	50	38
LIZ-2					
40	Current Dump Site	22	51	50	41
43	Old Dump Site	27	51	50	41
44	Suspected Dump Site	27	51	50	41

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 1, Old Dump Site

LOCATION: BAR-M

DATE OF OPERATION OR OCCURRENCE: 1956 to 1978

OWNER/OPERATOR: BAR-M

COMMENTS/DESCRIPTION: Received all wastes, including POL waste from site

SITE RATED BY: G. McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	0	10	0	30
C.	Land use/zoning within 1 mile radius	0	3	0	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	0	9	0	27
H.	Population served by surface-water supply within 3 miles downstream of site	2	6	12	18
I.	Population served by ground-water supply within 3 miles of site	0	6	0	18
			Subtotals	50	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 28

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

80 x 1.0 = 80

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

80 x 1.0 = 80

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	2	8	16	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	60	108
Subscore (100 x factor score subtotal/maximum score subtotal)				56
2. Flooding	0	1	0	100
		Subscore (100 x factor score/3)		0
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	N/A	8	--	--
		Subtotals	38	90
Subscore (100 x factor score subtotal/maximum score subtotal)				42
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	56

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	28
Waste Characteristics	30
Pathways	56
Total 164 divided by 3 =	55
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

55 x 0.95 = 52

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 3, Waste POL Pond

LOCATION: BAR-M

DATE OF OPERATION OR OCCURRENCE: --

OWNER/OPERATOR: BAR-M

COMMENTS/DESCRIPTION: Pond is a disposal site for waste POL

SITE RATED BY: G. McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	0	10	0	30
C.	Land use/zoning within 1 mile radius	0	3	0	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	0	9	0	27
H.	Population served by surface-water supply within 3 miles downstream of site	2	6	12	18
I.	Population served by ground-water supply within 3 miles of site	0	6	0	18
			Subtotals	58	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 28

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M

2. Confidence level (C = confirmed, S = suspected) C

3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

80 x 1.0 = 80

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

80 x 1.0 = 80

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	80
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	2	8	16	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	60	108
Subscore (100 x factor score subtotal/maximum score subtotal)				56
2. Flooding	0	1	0	100
		Subscore (100 x factor score/3)		0
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	N/A	8	--	--
		Subtotals	38	80
Subscore (100 x factor score subtotal/maximum score subtotal)				42
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	28
Waste Characteristics	80
Pathways	80
Total 188 divided by 3 =	63
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

63 x 1.0 = 63

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 4, Current Dump Site

LOCATION: BAR-M

DATE OF OPERATION OR OCCURRENCE: 1978 to present

OWNER/OPERATOR: BAR-M

COMMENTS/DESCRIPTION: Controlled site receives wastes from site and village

SITE RATED BY: G. McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	0	10	0	30
C.	Land use/zoning within 1 mile radius	0	3	0	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	0	9	0	27
H.	Population served by surface-water supply within 3 miles downstream of site	2	6	12	18
I.	Population served by ground-water supply within 3 miles of site	0	6	0	18
			Subtotals	50	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 28

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M

2. Confidence level (C = confirmed, S = suspected) S

3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 1.0 = 50

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

50 x 1.0 = 50

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	2	8	16	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	60	108
Subscore (100 x factor score subtotal/maximum score subtotal)				56
2. Flooding	0	1	0	100
		Subscore (100 x factor score/3)		0
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	N/A	8	--	--
		Subtotals	38	90
Subscore (100 x factor score subtotal/maximum score subtotal)				42
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	56

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	28
Waste Characteristics	50
Pathways	56
Total 134 divided by 3 =	45
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

45 x 1.0 = 45

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 8, Contaminated Drainage Cut

LOCATION: BAR-M

DATE OF OPERATION OR OCCURRENCE: --

OWNER/OPERATOR: BAR-M

COMMENTS/DESCRIPTION: Power house washwater discharged to drainage ditch

SITE RATED BY: C. McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	0	10	0	30
C.	Land use/zoning within 1 mile radius	0	3	0	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	0	9	0	27
H.	Population served by surface-water supply within 3 miles downstream of site	2	6	12	18
I.	Population served by ground-water supply within 3 miles of site	0	6	0	18
			Subtotals	50	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 28

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M

2. Confidence level (C = confirmed, S = suspected) C

3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

80 x 1.0 = 80

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

80 x 1.0 = 80

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	80
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	2	8	16	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	60	108
Subscore (100 x factor score subtotal/maximum score subtotal)				56
2. Flooding	0	1	0	100
		Subscore (100 x factor score/3)		0
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	N/A	8	--	--
		Subtotals	38	90
Subscore (100 x factor score subtotal/maximum score subtotal)				56
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	28
Waste Characteristics	80
Pathways	80
Total 188 divided by 3 =	63
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

63 x 1.0 = 63

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 9, Old Dump Site--N.W.

LOCATION: BAR-M

DATE OF OPERATION OR OCCURRENCE: 1970's

OWNER/OPERATOR: BAR-M

COMMENTS/DESCRIPTION: Received mostly scrap metal, suspect hazardous waste

SITE RATED BY: G. McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	0	10	0	30
C.	Land use/zoning within 1 mile radius	0	3	0	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	0	9	0	27
H.	Population served by surface-water supply within 3 miles downstream of site	2	6	12	18
I.	Population served by ground-water supply within 3 miles of site	0	6	0	18
			Subtotals	50	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 28

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 1.0 = 50

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

50 x 1.0 = 50

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	2	8	16	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	60	108
Subscore (100 x factor score subtotal/maximum score subtotal)				56
2. Flooding	0	1	0	100
		Subscore (100 x factor score/3)		0
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	1	8	8	24
Subsurface flows	2	8	16	24
Direct access to ground water	N/A	8	--	--
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	60

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	28
Waste Characteristics	50
Pathways	60
Total 138 divided by 3 =	46
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

46 x 0.95 = 44

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 13, Old Dump Site--East

LOCATION: POW-3

DATE OF OPERATION OR OCCURRENCE: 1956-1971

OWNER/OPERATOR: POW-3

COMMENTS/DESCRIPTION: Received all waste generated at site

SITE RATED BY: G. McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	0	10	0	30
C.	Land use/zoning within 1 mile radius	0	3	0	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	0	9	0	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	0	6	0	18
			Subtotals	34	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 19

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 1.0 = 50

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

50 x 1.0 = 50

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	52	108
Subscore (100 x factor score subtotal/maximum score subtotal)				48
2. Flooding	0	1	0	100
		Subscore (100 x factor score/3)		0
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	N/A	8	--	--
		Subtotals	38	90
Subscore (100 x factor score subtotal/maximum score subtotal)				42
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		48

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	19
Waste Characteristics	50
Pathways	48
Total 117 divided by 3 =	39
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

39 x 1.0 = 39

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 16, Old Dump Site--N.W.

LOCATION: POW-2

DATE OF OPERATION OR OCCURRENCE: 1956 to 1978

OWNER/OPERATOR: POW-2

COMMENTS/DESCRIPTION: Received all waste generated at the site

SITE RATED BY: G. McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	0	10	0	30
C.	Land use/zoning within 1 mile radius	0	3	0	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	0	9	0	27
H.	Population served by surface-water supply within 3 miles downstream of site	1	6	6	18
I.	Population served by ground-water supply within 3 miles of site	0	6	0	18
			Subtotals	44	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 24

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 1.0 = 50

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

50 x 1.0 = 50

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.			Subscore	--
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
Subscore (100 x factor score subtotal/maximum score subtotal)		Subtotals	52	108
2. Flooding	30	1	30	48
		Subscore (100 x factor score/3)		100
3. Ground-water migration				30
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	N/A	8	--	--
Subscore (100 x factor score subtotal/maximum score subtotal)		Subtotals	38	90
C. Highest pathway subscore				42
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				

IV. WASTE MANAGEMENT PRACTICES — Pathways Subscore: 48

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	24
Waste Characteristics	50
Pathways	48
Total 122 divided by 3 =	41
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

41 x 0.95 = 39

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 28, POL Storage Area

LOCATION: POW-1

DATE OF OPERATION OR OCCURRENCE: Current

OWNER/OPERATOR: POW-1

COMMENTS/DESCRIPTION: Evidence of surface-water contamination

SITE RATED BY: G. McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	0	10	0	30
C.	Land use/zoning within 1 mile radius	0	3	0	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	0	9	0	27
H.	Population served by surface-water supply within 3 miles downstream of site	1	6	6	18
I.	Population served by ground-water supply within 3 miles of site	0	6	0	18
			Subtotals	44	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 24

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

60 x 0.8 = 48

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

60 x 1.0 = 48

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	80
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	52	108
Subscore (100 x factor score subtotal/maximum score subtotal)				48
2. Flooding	0	1	0	100
		Subscore (100 x factor score/3)		0
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	N/A	8	--	--
		Subtotals	38	90
Subscore (100 x factor score subtotal/maximum score subtotal)				42
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	24
Waste Characteristics	48
Pathways	80
Total 152 divided by 3 =	51
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

51 x 1.0 = 51

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 29, Diesel Fuel Spill

LOCATION: POW-1

DATE OF OPERATION OR OCCURRENCE: 1978

OWNER/OPERATOR: POW-1

COMMENTS/DESCRIPTION: 25,000-Gallon Diesel Fuel Spill

SITE RATED BY: G. McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	0	10	0	30
C.	Land use/zoning within 1 mile radius	0	3	0	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	0	9	0	27
H.	Population served by surface-water supply within 3 miles downstream of site	1	6	6	18
I.	Population served by ground-water supply within 3 miles of site	0	6	0	18
			Subtotals	44	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 24

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 100

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

100 x 0.8 = 80

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

80 x 1.0 = 80

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	35	24
Net precipitation	1	6	6	18
Sur ce erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	52	108
Subscore (100 x factor score subtotal/maximum score subtotal)				48
2. Flooding	0	1	0	100
		Subscore (100 x factor score/3)		0
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	N/A	8	--	--
		Subtotals	38	90
Subscore (100 x factor score subtotal/maximum score subtotal)				42
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	48

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	24
Waste Characteristics	80
Pathways	48
Total 152 divided by 3 =	51
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

51 x 1.0 = 51

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 31, Old Dump Lagoon Site

LOCATION: POW-1

DATE OF OPERATION OR OCCURRENCE: 1955 to 1972

OWNER/OPERATOR: POW-1

COMMENTS/DESCRIPTION: Received all wastes generated at site

SITE RATED BY: G. McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	0	10	0	30
C.	Land use/zoning within 1 mile radius	0	3	0	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost *aquifer*	0	9	0	27
H.	Population served by surface-water supply within 3 miles downstream of site	1	6	6	18
I.	Population served by ground-water supply within 3 miles of site	0	6	0	18
			Subtotals	44	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 24

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 1.0 = 50

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

50 x 1.0 = 50

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	52	108
Subscore (100 x factor score subtotal/maximum score subtotal)				48
2. Flooding	0	1	0	100
		Subscore (100 x factor score/3)		0
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	N/A	8	--	--
		Subtotals	38	90
Subscore (100 x factor score subtotal/maximum score subtotal)				42
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		48

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	24
Waste Characteristics	50
Pathways	48
Total 122 divided by 3 =	41
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

41 x 1.0 = 41

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 32, Husky Dump Site

LOCATION: POW-1

DATE OF OPERATION OR OCCURRENCE: 1972-present

OWNER/OPERATOR: POW-1

COMMENTS/DESCRIPTION: Receives all wastes generated at site and at Husky Oil Co.

SITE RATED BY: G. McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	0	10	0	30
C.	Land use/zoning within 1 mile radius	0	3	0	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	0	9	0	27
H.	Population served by surface-water supply within 3 miles downstream of site	1	6	6	18
I.	Population served by ground-water supply within 3 miles of site	0	6	0	18
			Subtotals	44	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 24

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 1.0 = 50

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

50 x 1.0 = 50

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	52	108
Subscore (100 x factor score subtotal/maximum score subtotal)				48
2. Flooding	0	1	0	100
		Subscore (100 x factor score/3)		0
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	N/A	8	--	--
		Subtotals	38	90
Subscore (100 x factor score subtotal/maximum score subtotal)				42
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		48

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	24
Waste Characteristics	50
Pathways	48
Total 122 divided by 3 =	41
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

41 x 1.0 = 41

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 37, Diesel Fuel Spills

LOCATION: LIZ-3

DATE OF OPERATION OR OCCURRENCE: Early 1970's and 1976

OWNER/OPERATOR: LIZ-3

COMMENTS/DESCRIPTION: Two 10,000-gallon diesel fuel spills under the power house

SITE RATED BY: G. McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	0	10	0	30
C.	Land use/zoning within 1 mile radius	0	3	0	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	0	9	0	27
H.	Population served by surface-water supply within 3 miles downstream of site	1	6	6	18
I.	Population served by ground-water supply within 3 miles of site	0	6	0	18
			Subtotals	38	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 21

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 100

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

100 x 0.8 = 80

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

80 x 1.0 = 80

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	2	8	16	24
Net precipitation	1	6	6	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	44	108
Subscore (100 x factor score subtotal/maximum score subtotal)				41
2. Flooding	0	1	0	100
		Subscore (100 x factor score/3)		0
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	N/A	8	--	--
		Subtotals	38	90
Subscore (100 x factor score subtotal/maximum score subtotal)				42
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		42

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	21
Waste Characteristics	80
Pathways	42
Total 143 divided by 3 =	48
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

48 x 1.0 = 48

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 38, Current Dump Site

LOCATION: LIZ-3

DATE OF OPERATION OR OCCURRENCE: 1974 to present

OWNER/OPERATOR: LIZ-3

COMMENTS/DESCRIPTION: Receives all wastes from site, well maintained dump site

SITE RATED BY: G. McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	0	10	0	30
C.	Land use/zoning within 1 mile radius	0	3	0	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	0	9	0	27
H.	Population served by surface-water supply within 3 miles downstream of site	1	6	6	18
I.	Population served by ground-water supply within 3 miles of site	0	6	0	18
			Subtotals	34	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 19

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M

2. Confidence level (C = confirmed, S = suspected) S

3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 1.0 = 50

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

50 x 1.0 = 50

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	8	18
Surface erosion	1	8	6	24
Surface permeability	1	6	8	18
Rainfall intensity	1	8	6	24
		Subtotals	52	108
Subscore (100 x factor score subtotal/maximum score subtotal)				48
2. Flooding	0	1	0	100
		Subscore (100 x factor score/3)		0
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	8	24
Direct access to ground water	N/A	8	--	--
		Subtotals	38	90
Subscore (100 x factor score subtotal/maximum score subtotal)				42
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	48

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	19
Waste Characteristics	50
Pathways	48
Total 117 divided by 3 =	39
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

39 x 1.0 = 39

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 39, Old Dump Site--South

LOCATION: LIZ-3

DATE OF OPERATION OR OCCURRENCE: 1956 to 1974

OWNER/OPERATOR: LIZ-3

COMMENTS/DESCRIPTION: Received all wastes from site

SITE RATED BY: G. McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	0	10	0	30
C.	Land use/zoning within 1 mile radius	0	3	0	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	0	9	0	27
H.	Population served by surface-water supply within 3 miles downstream of site	1	6	6	18
I.	Population served by ground-water supply within 3 miles of site	0	6	0	18
			Subtotals	40	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 22

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 1.0 = 50

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

50 x 1.0 = 50

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	52	108
Subscore (100 x factor score subtotal/maximum score subtotal)				48
2. Flooding	0	1	0	100
		Subscore (100 x factor score/3)		0
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	N/A	8	--	--
		Subtotals	38	90
Subscore (100 x factor score subtotal/maximum score subtotal)				42
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	48

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	22
Waste Characteristics	50
Pathways	48
Total 120 divided by 3 =	40
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

40 x 0.95 = 38

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 40, Current Dump Site

LOCATION: LIZ-2

DATE OF OPERATION OR OCCURRENCE: 1978 to present

OWNER/OPERATOR: LIZ-2

COMMENTS/DESCRIPTION: Receives all wastes from site and nearby village

SITE RATED BY: G. McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	0	10	0	30
C.	Land use/zoning within 1 mile radius	0	3	0	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	0	9	0	27
H.	Population served by surface-water supply within 3 miles downstream of site	1	6	6	18
I.	Population served by ground-water supply within 3 miles of site	0	6	0	18
			Subtotals	40	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 22

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 1.0 = 50

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

50 x 1.0 = 50

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	52	108
Subscore (100 x factor score subtotal/maximum score subtotal)				48
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	1	8	8	24
Subsurface flows	1	8	8	24
Direct access to ground water	N/A	8	--	--
		Subtotals	46	90
Subscore (100 x factor score subtotal/maximum score subtotal)				51
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	51

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	22
Waste Characteristics	50
Pathways	51
Total 123 divided by 3 =	41
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

41 x 1.0 = 41

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 43, Old Dump Site

LOCATION: LIZ-2

DATE OF OPERATION OR OCCURRENCE: 1956 to 1978

OWNER/OPERATOR: LIZ-2

COMMENTS/DESCRIPTION: Received all wastes from site

SITE RATED BY: G. McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	2	4	8	12
B.	Distance to nearest well	0	10	0	30
C.	Land use/zoning within 1 mile radius	0	3	0	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	0	9	0	27
H.	Population served by surface-water supply within 3 miles downstream of site	1	6	6	18
I.	Population served by ground-water supply within 3 miles of site	0	6	0	18
			Subtotals	48	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 27

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 1.0 = 50

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

50 x 1.0 = 50

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	52	108
Subscore (100 x factor score subtotal/maximum score subtotal)				48
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	1	8	8	24
Subsurface flows	1	8	8	24
Direct access to ground water	N/A	8	--	--
		Subtotals	46	90
Subscore (100 x factor score subtotal/maximum score subtotal)				51
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		51

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	27
Waste Characteristics	50
Pathways	51
Total 128 divided by 3 =	43
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

43 x 0.95 = 41

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 44, Suspected Dump Site

LOCATION: LIZ-2

DATE OF OPERATION OR OCCURRENCE: 1956 to 1980

OWNER/OPERATOR: LIZ-2

COMMENTS/DESCRIPTION: Used primarily by villagers

SITE RATED BY: G. McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	2	4	8	12
B.	Distance to nearest well	0	10	0	30
C.	Land use/zoning within 1 mile radius	0	3	0	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	0	9	0	27
H.	Population served by surface-water supply within 3 miles downstream of site	1	6	6	18
I.	Population served by ground-water supply within 3 miles of site	0	6	0	18
			Subtotals	48	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 27

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M

2. Confidence level (C = confirmed, S = suspected) S

3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 1.0 = 50

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

50 x 1.0 = 50

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	52	108
Subscore (100 x factor score subtotal/maximum score subtotal)				48
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	1	8	8	24
Subsurface flows	1	8	8	24
Direct access to ground water	N/A	8	--	--
		Subtotals	46	90
Subscore (100 x factor score subtotal/maximum score subtotal)				51
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		51

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	27
Waste Characteristics	50
Pathways	51
Total 128 divided by 3 =	43
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

43 x 0.95 = 41